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THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 72: No. 13. New York, Thursday, September 24, 1903.

$5 00 a Year, including Postage.
Single Copies, 15 Cents.

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SHULTZ PATENT SABLE RAWHIDE BELTING
SHULTZ
SHULTZ PATENT WOVEN LEATHER LINK BELTING
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St. Louis, Mo.
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CHICAGO, ILL.
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Bristol's Patent Steel Belt Lacing.

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SAVES Time, Belts, Money.
Greatest Strength with Least Metal
Send for Circulars and Free Samples.
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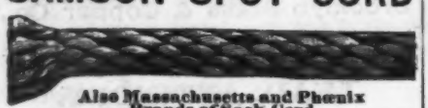
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Cleveland City Forge and Iron Co., - Cleveland, O.

MERRILL BROS., 465 Kent Ave., BROOKLYN, N. Y.

Mill Cinder.
PILLING & CRANE, Girard Building, Phila., Farmers' Bank, Pittsburg, Empire Bldg., New York, Board of Trade, Boston.

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The virtue of galvanized iron is workableness.

How easy it sounds! what difficulty avoids!

It simplifies business wonderfully.

Quick service.

Return a whole sheet for an inch of fault.

American Sheet Steel Company
Battery Park New York

CABLEGRAM

To PRESIDENT ROOSEVELT,
Oyster Bay.

American Rifles, **Ammunition** and Men won victory to-day over Great Britain, Canada, France, Norway, Australia and Natal, and bring back Palma trophy.

(Signed) LIEUT. ALBERT S. JONES,
Secretary of the National Rifle Association of America.

Copied from N. Y. HERALD.

This sweeping victory for America, and the extraordinary score of 1,570 out of a possible 1,800 were made with 30-40 regular factory Cartridges, manufactured by the

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selected after exhaustive trials, by the entire American Team in preference to all others, for their wonderful uniformity and extreme accuracy.

Scores are improved by using U. M. C. ammunition.
Souvenir Cartridges (without powder) on application.

THE UNION METALLIC CARTRIDGE CO.
313 Broadway, - New York City
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CAHALL BOILERS See Page 126.

REGULAR PATTERN.

PLATE PATTERN.

CAPEWELL HORSE NAILS

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THE CAPEWELL HORSE NAIL COMPANY
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CORRUGATED PATTERN.

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Jenkins Bros.' Valves.

The metal and workmanship are the best. All parts are interchangeable. Need no regrinding, as they are more effectively repaired by renewing the disc, which can be easily and quickly done without removing valve from the pipe, and costs but a trifle. Insist on having the genuine, which always bear our Trade-Mark.

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for Drawing and Stamping
THE AMERICAN TUBE & STAMPING COMPANY
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SEE PAGE 28.

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Best Anti-Friction Metal for all Machinery Bearings.
Fac-Simile of Bar. Beware of Imitations.

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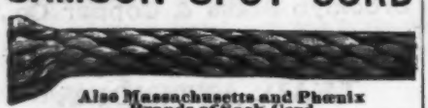
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San Francisco, New Orleans, Montreal, Boston, Pittsburg and Philadelphia. We manufacture all grades of Babbitt Metals at competitive prices.

Racer and Hockey Skates.

Among the newest skates shown in the new illustrated ice skate catalogue just issued by the Union Hardware Company, New York office in charge of Tower & Lyon Company, 95 Chambers street, are the racer and hockey skates here illustrated. Fig. 1, the Swedoh racer, has

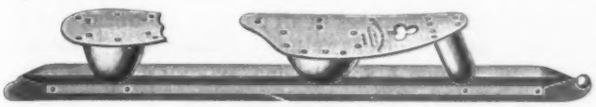


Fig. 1.—Swedoh Racer Skate.

runners of finely tempered tool steel, set longitudinally in a diamond shaped tube formed entirely of one piece of metal, and without brazed or soldered end in front, where the greatest stress comes. This skate also now has a steel ball, consisting of two parts, one attached to each side, as required by the rinks for safety. This skate is intended to satisfy a demand for a light racing skate, which shall be strong and fast. The cups which support the foot plates are made to clasp the diamond tube, to which they are securely brazed. They can be furnished with 14-inch runners, 10 and 10½ inches long;

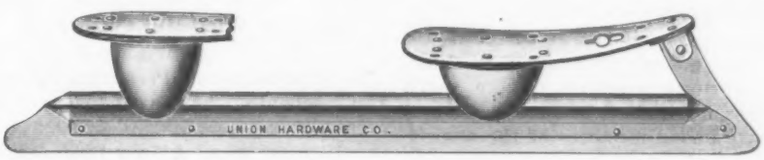


Fig. 2.—Swedoh Hockey Skate.

16-inch runners, 10½ to 11½ inches long, by half inches, and 18-inch runners in sizes 11, 11½ and 12 inches, all the runners being 1-16 inch thick. The same principles apply to the Swedoh hockey, Fig. 2, except that the construction is heavier throughout for the severe work required of it, there being no front steel ball. The sizes are 10½ to 12 inches, inclusive, by half inches. Fig. 3 is a ladies' hockey skate, No. 65, with flanged or ribbed blade, the leading new characteristic of which is the full back strap. This strap is of best quality of oak tanned russet leather, morocco lined. The runner is made of the best

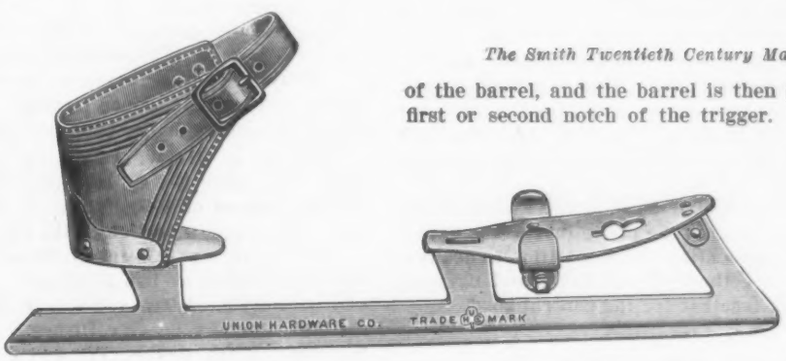
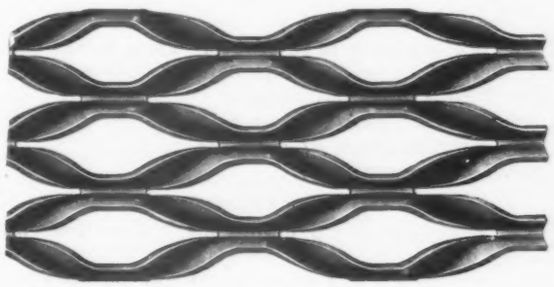


Fig. 3.—Ladies' Hockey, with Flanged Blade and Back Strap.

grade of welded steel and iron, full polished and finely nickeled.

Imperial Spiral Lath.

The Imperial spiral lath shown in the accompanying illustration is manufactured by the Imperial Expanded Metal Company of Chicago. The two features which are said to recommend the lath are flexibility, permitting it to be molded easily into coves, moldings, &c, and the spiral twist to give the mortar a firm hold and permits the covering of the back as well as the front of the lath, with the mortar. The lath may be put on a brick wall, rough side out, without furring. The manufacturers state that the metal is cut cold without being subject to pickling, and hence bright, resisting the action of oxygen; that the webs being spiral and the mesh small, a continuous and distributed bond is produced, with economy in the use

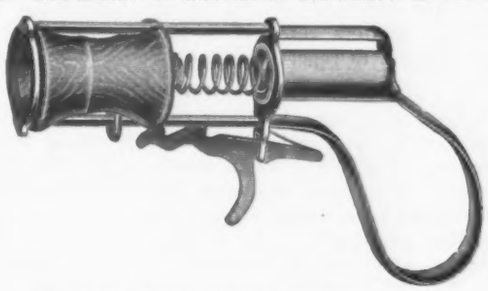


Imperial Spiral Lath.

of the plaster. The lath nests closely, forming compact bundles.

The Smith Twentieth Century Marble Shooter.

The frame work and actuating mechanism of the marble shooter shown herewith is pressed into form out of cold rolled sheet steel, the barrel being turned from wood. The marble is inserted in the hollow at the front



The Smith Twentieth Century Marble Shooter.

of the barrel, and the barrel is then pushed back to the first or second notch of the trigger. Pressure upon the trigger releases the spring and projects the marble. The device is made in the Thompson factory of the Federal Mfg. Company, Chicago, Ill.

WILLIAM H. TUTHILL, secretary of the Tuthill Spring Company, Chicago, has recently returned from an 18,000-mile journey to Spain, Portugal and Italy via Cuba, Jamaica and Trinidad. For a side trip he visited the city of Manoas, at the mouth of the Negro River, 900 miles up the Amazon. In connection with other matters of interest, Mr. Tuthill refers especially to Manoas as a lively western city of 40,000 and the center of the rubber interest, the all absorbing business of the Amazon Valley. Five thousand ton steamers sail direct from Manoas to Lisbon and Liverpool, and to New York.

HOW TO INCREASE THE USEFULNESS OF RETAIL HARDWARE ORGANIZATIONS.

BY A MEMBER OF THE NEW YORK ASSOCIATION.

TO interest members more constantly in association work is greatly to be desired. Three things occur to me that would, perhaps, stimulate this interest:

FIRST. *A State organizer.*

SECOND. *Regular quarterly meetings of the Executive Committee or Board of Directors.*

THIRD. *Local associations.*

The State Organizer.

The organizer should devote his whole time and energies to the work of the association, visiting dealers, soliciting members and attending to any business that may be referred to him by the Executive Committee.

Circular letters setting forth the aims and the advantages to be derived from membership meet with responses and secure members, in some cases, but they do not accomplish results, nor are they as effective as a personal interview with an accredited official, who can enter fully into and explain the benefits of the association.

This officer could also assist in the formation of local associations. He might, as a matter of economy, act as secretary.

The Executive Committee.

The Executive Committee, or Board of Directors, the active body between the annual association meetings, should hold regular quarterly meetings. There would be business enough to occupy a short business session, if it were generally known among members of the association that the committee met at stated times and matters could be submitted for consideration and receive prompt attention. A general impression seems to prevail that all business must wait until the annual meeting of the association. This is an error and should be corrected. Part of the duties of an organizer would be to investigate matters referred to him by the Executive Committee and to report thereon.

Local Association.

By local association is meant an organization of dealers in a vicinity, or adjoining territory, whose trade is contiguous. The local associations are of great assistance to State associations, as dealers quickly see direct results and are soon satisfied that greater good can be accomplished by larger numbers. Many local associations are in existence, and those interested cannot speak too highly of them. They are the means of creating confidence and promoting good fellowship among dealers, eliminating the antagonistic feeling that sometimes exists. Some of the advantages of local organization are uniformity of prices, establishing a system of credits and interchanging business ideas, and possibly combined purchases.

The State organizer would be of great assistance as an intermediary in arranging the preliminaries incidental to organization, first presenting the proposition to dealers, then bringing them together. Local, State and national associations all work together for the general good.

PRICE-LISTS, CIRCULARS, &c.

THE UNION HARDWARE COMPANY, Torrington, Conn., New York office 95 Chambers street, in charge of Tower & Lyon Company, Ice Skate catalogue, 1903-4: While the company are making the same general line for 1903 as in past years, they are presenting some new high grade goods with special features. Their flanged blade has been applied to many numbers of Skates, and three patterns of all Clamp Skates are shown for ladies who use common sense shoes. A new Swedoh racer and an extension Bob Skate are illustrated, the latter being for children.

THE WILLIAM CONNORS PAINT MFG. COMPANY, Troy, N. Y.: Artistic folder containing printed matter relating to the American Seal Brand of Mixed, Roof, Floor, Carriage and Anti-Rust Paints and White Lead Putty.

MORLEY BROTHERS, Saginaw, Mich.: Illustrated catalogue devoted to Guns, Ammunition and Sporting Goods. In addition to this the firm issue separate catalogues of Hardware, Saddlery and Harness, Fishing Tackle, Athletic Goods, Stoves and House Furnishing Goods, Silver Ware and Cutlery, which will be sent upon request.

W. & B. DOUGLAS, Middletown, Conn., New York office 83 John street: 1903 edition illustrated catalogue devoted to Hand and Power Pumps, Hydrants, Hydraulic Rams, Well Fixtures, Garden engines, &c. The catalogue calls attention to the firm's record of over 70 years' cordial relations with customers in all parts of the world, and to the fact that the company's line is constantly increasing.

A. W. BISHOP & SON, Racine, Wis.: Catalogue illustrating Bishop's Independent Automatic Even Spooling Device for Fishing Reels, Lightning Fish Scalers, Fish Hook Shield and Gun Cleaners.

THE D. W. BOSLEY COMPANY, Chicago, Ill.: Catalogue and price-list relating to the company's Rubber, Flexible and Metallic Weather Strips, Window Cleaners, Floor Scrubbers, Counter Cleaners, &c.

ARMSTRONG HARDWARE COMPANY, Oklahoma City, O. T.: First annual Stove catalogue. The company also issue Screen Door catalogues, and are at present compiling an architect's edition catalogue of Builders' Hardware, as well as a Sporting Goods catalogue. The company are exclusive jobbers.

BAKER MFG. COMPANY, Evansville, Wis., W. H. Bicknell, Jr., 25 Whitehall street, New York, sole export agent: Pump circular, giving illustrations and description of new Wind Mill Pumps.

F. REISSMANN, West Point, N. Y.: Illustrated circular of Reissmann's Perfection Sandpaper Holder, for use of mechanics who use sandpaper, emery paper and emery cloth.

SCULLY STEEL & IRON COMPANY, Chicago, Ill.: Stock list for September and October, 1903. A catalogue of 144 pages contains lists of Flange, Tank and Fire Box Steel, Flange and Tank Steel Heads, Steel Sheets, Boiler Tubes and Rivets in stock. The remainder of the catalogue is devoted to Tools, Heavy Hardware, Tables of Weights, &c.

R. HOFFELD & Co., Buffalo, N. Y.: Circular price-list of Buffalo Patent Axle Washers. These are put up, one set in a package, for convenience of the dealer and consumer.

THE T. H. BULLOCK BELLOWS & FORGE COMPANY, Cleveland, Ohio: Illustrated folder showing Portable and Stationary Forges, Riveting Forges and Tuyere Irons.

WHITE MFG. COMPANY, 193 Michigan street, Chicago, Ill.: Catalogue No. 36, devoted to Gasoline Vapor Lighting Devices. Illustrations are shown of Arc and Street Lamps, Removable Fount Lamps, Pendent Lamps, Match Lighters, Torches, Whitewashing and Spraying Machines, &c. Illustrations are given of the American Air Light System for general indoor lighting, from 1 to 20 lights, adapted to stores, halls, churches, bowling alleys, &c.

THE A. J. HARWI HARDWARE COMPANY, Atchison, Kan.: Catalogue No. 42, of seasonable Hardware for the fall and winter of 1903. Illustrations of Guns and Ammunition occupy a portion of the catalogue.

THE ROME MFG. COMPANY, Rome, N. Y.: Illustrated catalogue and price-list D, devoted to Polished Copper and Nickel Plated Tea and Range Kettles, Tea and Coffee Pots, Pitchers, Serving Dishes, Trays, Dippers, Drinking Cups, Wash Basins, Tin and Copper Wash Boilers, Insect Sprayers; Copper, Brass and Tin Specialties.

THE HART & COOLEY COMPANY, New Britain, Conn., for whom the Stanley Works, New Britain, Conn., and 79 Chambers street, New York, market the entire product, have just issued an illustrated catalogue of "H. & C." Wrought Steel Registers, Ventilators, Floor Borders, and Screens for covering steam pipes, the lists used being uniform with those of other leading makers.

GRAEF & SCHMIDT, 107 Chambers street, New York, sole agents in the United States and Canada for J. A. Henckels, Solingen, Germany: Illustrated catalogue of the leading styles of Manicure, Cutlery and Shaving Sets of the Twins brand. Some of the specialties at moderate prices are Pocket Manicure Traveling Sets for both ladies and gentlemen, in plush lined leather cases; others for children, with a wide range of all kinds of sets for adults for use at home, in numerous mountings and various cases, both rigid and flexible.

THE IRON AGE

THURSDAY, SEPTEMBER 24, 1903.

A Model Bridge and Construction Shop.—II.

Pennsylvania Steel Company's New Plant.

(Concluded from page 7, September 10, 1903.)

Main Shop.

We now enter the most important building of the entire plant, and the one in which the most originality has been displayed in both the arrangement and equipment. Entering this from the receiving yard, there is first the punching shop, where all punching of plates and beams is done. In the transept devoted to hydraulic work is a 350-ton press built by the Chambersburg Engineering Company. This is used for buckling plates used in floor construction. Pressure is supplied by a three-cylinder pump and accumulator. The ram is actuated by three cylinders, the middle one exerting a pressure of 225 tons and the two outside ones together a pressure of 125 tons, making a combined pressure of 350 tons.

In the punch shop at present are eight Hilles & Jones punches, some of which are double and all of which are motor driven. Work is handled by two upper 5-ton traveling wall cranes and one 15-ton traveling crane the full width of the building. A machine for straightening built-up girders is built upon the same principle as a rail bender. The machine has two stationary supports and a ram, which are placed at the points of a triangle. The beam, having been placed between the ram and two supports, is deflected the proper amount by the action of the ram.

The second transept, which will eventually be extended beyond the south side of the building, is 88 feet 4 inches wide. This necessitated the overlapping of the crane service of this wing with that of the main room. The transept crane crosses the main shop beneath the crane tracks of the latter, the distance between the two crane systems being sufficient to permit the passage of any load carried by the main cranes. In this way the two crane services are made to overlap.

We may state in this connection that all of the traveling cranes in this transept, in the main shop, and in the receiving yard are of the same span—viz., 85 feet from

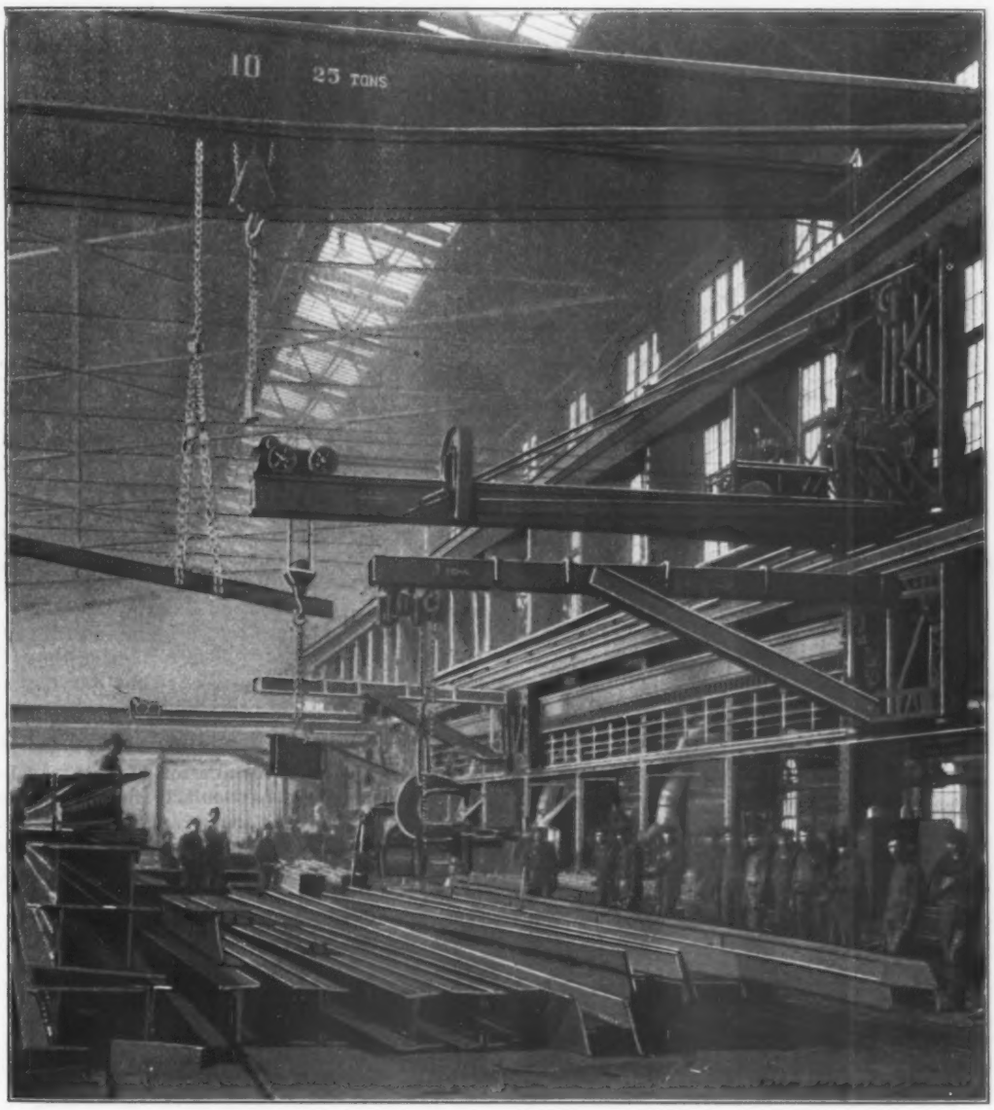


Fig. 11.—Two Wall Cranes and One Traveling Crane in Same Vertical Plane.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

center to center of rails—and were all built by the Morgan Engineering Company.

Near the center of the building on the north side are located the rivet heating furnaces and forge fires, near which are placed the pneumatic riveting machines.

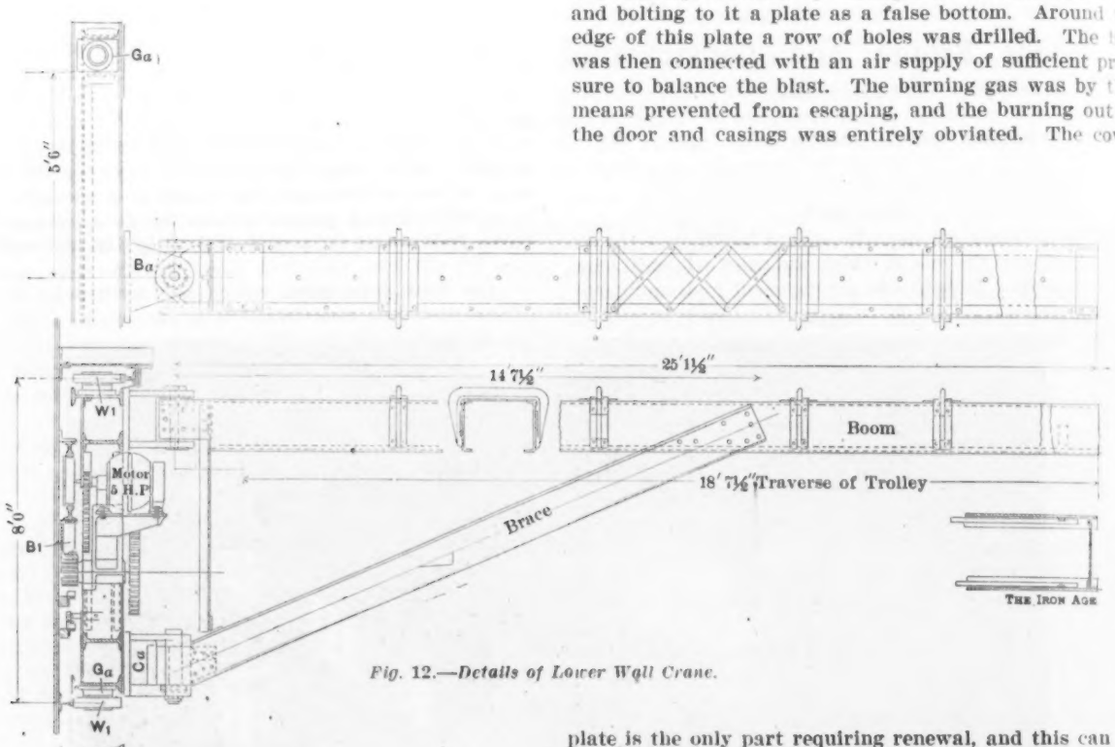


Fig. 12.—Details of Lower Wall Crane.

warping of the furnace doors, and it was next to impossible to make them air tight against the pressure used; and the hot flames, escaping through the cracks around the door, burned out the doors and ate away the door casings so that both had to be frequently renewed. This was entirely overcome by casting a box without a bottom and bolting to it a plate as a false bottom. Around the edge of this plate a row of holes was drilled. The box was then connected with an air supply of sufficient pressure to balance the blast. The burning gas was by this means prevented from escaping, and the burning out of the door and casings was entirely obviated. The cover plate is the only part requiring renewal, and this can be cheaply and quickly effected.

The sketch, Fig. 19, shows in plan and elevation two simple wall brackets which are intended for supporting the pneumatic riveters when not in use. It is not the policy of the management of these works to permit valuable tools to be dumped anywhere on the floor, whether in the way or out of the way of the workmen. This bracket consists of two hinged arms, forming a link, one end of which is hinged to a column and the outer end of which is formed with a yoke to receive the riveter. By this means the riveter can be swung out of the way and kept from possible injury.

Wall Traveling Cranes.

A most elaborate installation of wall traveling cranes has been provided, particularly in this portion of the main building. These are arranged upon two systems of tracks secured to the building columns and placed one above the other. Each track supports several cranes of a lifting capacity of 3, 5 and 10 tons. Each crane is abso-

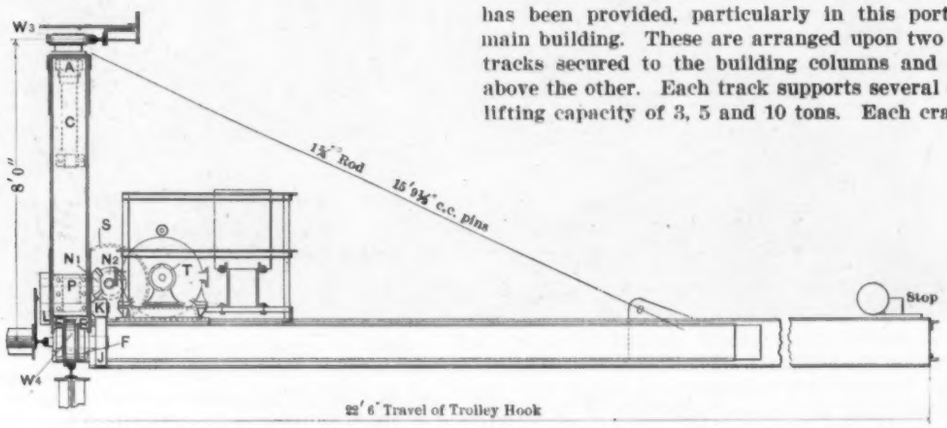


Fig. 13.—Details of Upper Wall Crane.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

These furnaces at the time our photographs were taken used coal as a fuel, the blast being furnished by a positive pressure blower. The smoke arising from these accounts for the foggy condition of the extreme distance in Figs. 11 and 18. Gas has since been introduced, clearing the atmosphere completely.

Much trouble was experienced by the burning out and

lutely independent of any and all of the others, and in the case of the upper ones the load can be racked out far enough to clear the end of the one beneath. This is very clearly indicated in Fig. 11, where there is a 3-ton crane on the lower track and a 10-ton crane on the upper track, both carrying loads and yet both being independent of each other in all their movements. In a vertical line

just above these is one of the 25-ton traveling cranes, to the hook of which is attached a beam. In Fig. 14 are two of the lower cranes handling pneumatic riveting machines upon the same job. In Fig. 18 are shown five of the lower cranes and three of the large traveling cranes.

It is difficult to dwell with too much emphasis upon the advantages derived from this system of crane service. Its extreme flexibility is apparent; no matter where the work to be handled may be located, it is possible to bring some one of the three crane systems into use and to do this without unnecessary or vexatious delay. The consequence of this is that work is passed through the shop very rapidly indeed.

Except the upper wall crane shown in Fig. 11, the trolley of which is traversed by wire rope from the cage, all of the cranes are electrically operated throughout. This does not apply, however, to the swinging of the cranes, which, in the case of the lower ones, is accomplished by hand from the floor. We may also state that these lower cranes are all controlled from the floor, suitable connections being made with the switches.

A general idea of the construction and operation of these cranes will be understood from the drawings in Figs. 12, 13, 15, 16 and 17. The beam of the lower crane is supported by a brace extending to the bottom of the frame carrying the driving mechanism, while the beams of the upper cranes are supported by a tie rod leading to the upper part of the frame. This is done so that the upper part of the beam of the lower crane may be placed as near as possible to the underside of the beam of the upper crane. The load of the crane in each case is taken by wheels, one at each end of the frame, running upon a horizontal track, while the outward pull of the frame is taken by an upper wheel, A, Fig. 13, which is mounted with its axis vertical, as indicated. These lower wheels are the driving wheels for the upper cranes, and are operated from the motor by means of suitable gearing. This is shown very clearly in Fig. 15, where the motor W^2 is geared down to the horizontal shaft B, which carries a bevel gear at each end engaging with a bevel gear N^1 in the frame, this, in turn, being suitably connected to the driving wheels. In the case of the lower cranes the travel is effected by spur gearing from the motor to a pinion engaging with an inverted rack.

Provision is also made for preventing the tipping of a crane when the load is at the extreme outer end of the beam and when the beam is swung in so as to stand parallel with the track. There are eight small jib cranes on the north side of the shop and seven on the south side covering a gang of reaming machines, each being of 3 tons capacity. Of the upper jibs, all those between the lower and traveling cranes, there are one 10-ton Morgan and three 5-ton jibs on the north side and two 5-ton jibs on the south side.

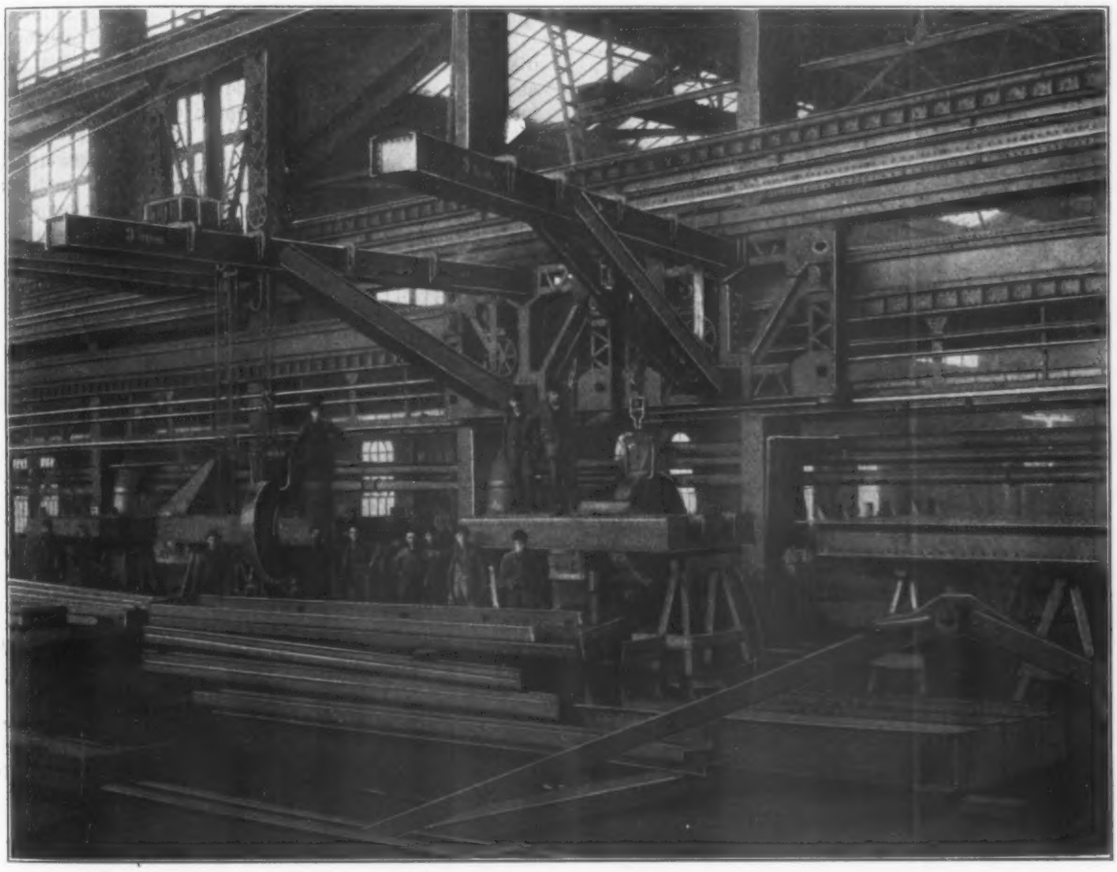


Fig 14.—Wall Cranes Handling Riveters.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

A Gang of 36 Reamers.

Having provided adequate appliances for handling work it became essential to furnish machines of a character equal to if not superior to the others. How this was accomplished in the gang of 36 reaming machines we shall now explain: As is well understood, work of the kind here done consists of riveting together steel plates and shapes to form a bridge or building. The separate parts are first punched to templet, then bolted together and the rivet holes reamed in order to insure an accurate and true bearing for the rivets. To economically perform the reaming operation it is necessary to have an easily movable machine, as it is easier and quicker to shift the tool than the work. Again, it would be exceedingly slow, inconvenient and expensive to have only a single tool at work on a piece. There must be many, and the arrangement must be such that they may be employed practically as a unit. Prompt shifting and adjustment from one hole to another are essential, and when the reamer has been brought into alignment with the hole, the cutting action must be automatic in the strictest sense.

This last qualification is of the utmost importance.

When two or more holes are brought together the alignment is not perfect; in other words, the axes of the holes are not in the same line. It is the duty of the reamer to remedy this and also to enlarge the holes to the required size. In each instance the amount of work varies, and the reamer must meet these constantly changing conditions instantly.

These machines, which were designed under the direction of J. V. W. Reynders and built by the Baush Machine Tool Company, perfectly conform to all of the above specifications. The principle underlying their construction will be readily understood. The spindle is fed and returned by a combined oil and air pressure, which, if we may express it that way, works in a closed cycle. How this is accomplished will be seen from Figs. 21, 23 and 25.

The spindle terminates at its upper end in a piston which works in the cylinder B. Air is admitted on top of the piston at a suitable pressure, depending on the character of the work to be done, whether solid drilling or reaming, the usual pressure being about 60 pounds per square inch. Underneath the cylinder, and connecting with the auxiliary chamber A by means of a regulating valve, is an oil reservoir, which not only regulates the feed of the drill but also acts as a dash pot to prevent too rapid movement of the spindle after the drill has passed through the work. The various movements are accomplished by a suitable valve arrangement in convenient reach of the operator. This provides an elastic though constant pressure on the drill, resulting in a true feed, which accommodates itself instantly to any variation in the resistance presented to the cutting tool, due to irregularity of punched holes or material. The oil valve is arranged for a quick return of the spindle and an adjustable device is provided for automatically raising the spindle after the drill has passed through the hole.

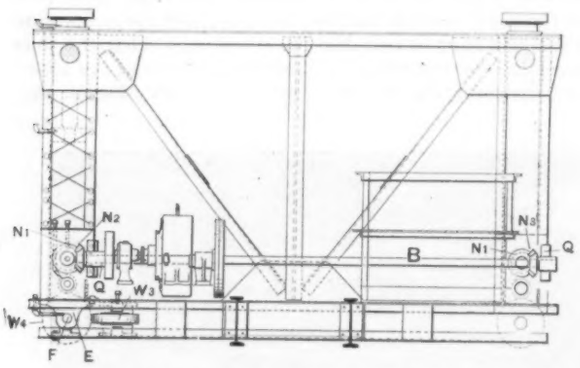


Fig. 15.—Detail Upper Wall Crane.

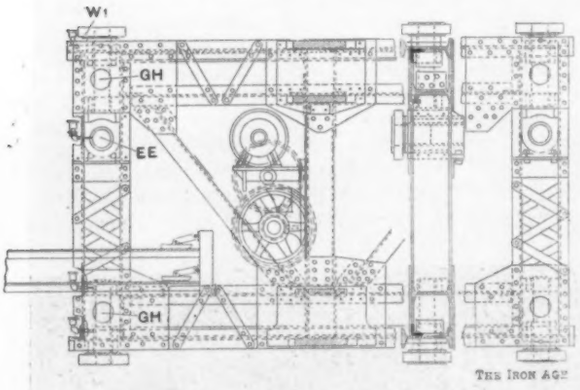


Fig. 16.—Wall Crane Detail.

The machines are supported upon two horizontally disposed beds or rails placed in the same vertical plane, as shown in Figs. 20, 28 and 29, and attached to the building columns. Each machine can be moved to any desired position on these rails. The entire group is shifted, each independently, and the arm raised and lowered by power. Extending along the rear of each frame is a splined shaft, which is divided at the center, and each half of which is operated by a motor. The bearings for this shaft are attached to the saddle of the machine, Fig. 29. Splined to the shaft is a beveled gear engaging with a gear on a vertical shaft in a bearing on the frame. By this means power is provided for moving the machines along the rails and for elevating and lowering the arms. Spur gears connect this shaft with a second vertical shaft, Fig. 28. This shaft carries an upper set of gears, two friction clutches and a worm, Figs. 24 and 26. The upper clutch brings the gears into action for raising the arm, while the lower clutch actuates, through a worm and gear, a pinion meshing with a rack attached to the upper rail. The arm is swung by hand, and the drill head racked along the arm by the hand wheel shown in Fig. 20. The spindle is operated by an electric motor mounted on the drill head. Thirty of the machines are arranged to cover a girder 7 feet deep, and six to work on a girder 10 feet deep. Each machine has a swing of 9 feet and a spindle feed of 18 inches.

The floor both on this and the opposite side of the shop is made of rails laid 4 feet apart and filled in with concrete. Each way the floor drains to a gutter leading to a well in which is an electrically operated pump. This supplies soda water to the reamers. The arrangement is shown in Fig. 3.

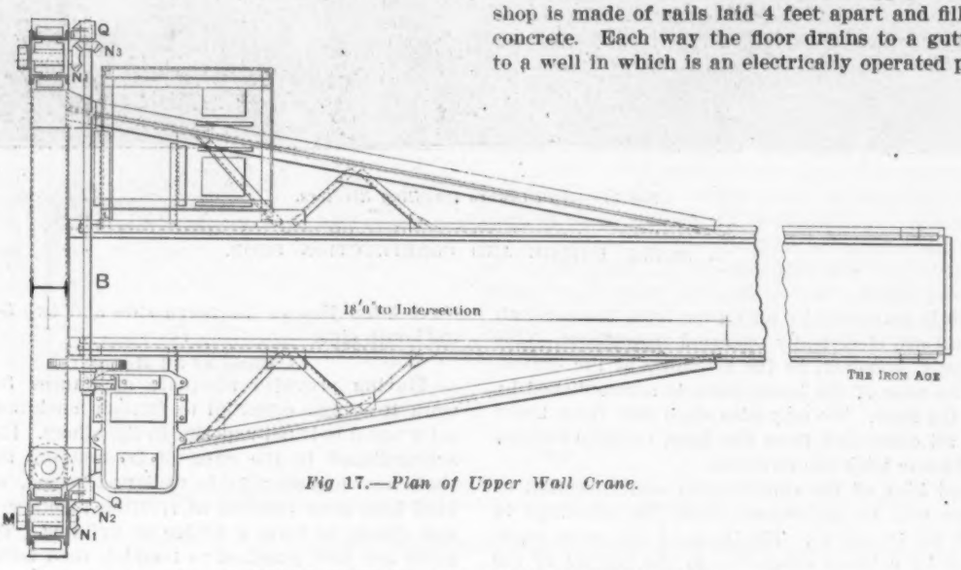


Fig 17.—Plan of Upper Wall Crane.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

The London *Iron and Coal Trades Review* for Friday, September 4, is an exceptionally fine issue. It contains a full report of the Barrow meeting of the Iron and Steel Institute, including a reproduction of the papers read during the sessions. The report is embellished with numerous portraits of prominent members of the institute and of the authors of the papers read, as well as illustrated descriptions of the local works visited by the

members. The enterprise of the publishers of this journal is particularly noteworthy, in view of the fact that the issue was published during the same week in which the meeting of the institute was held.

The Growth of Protective Sentiment in Great Britain.

Although the movement instituted by Mr. Chamberlain in favor of preferential tariffs on merchandise com-

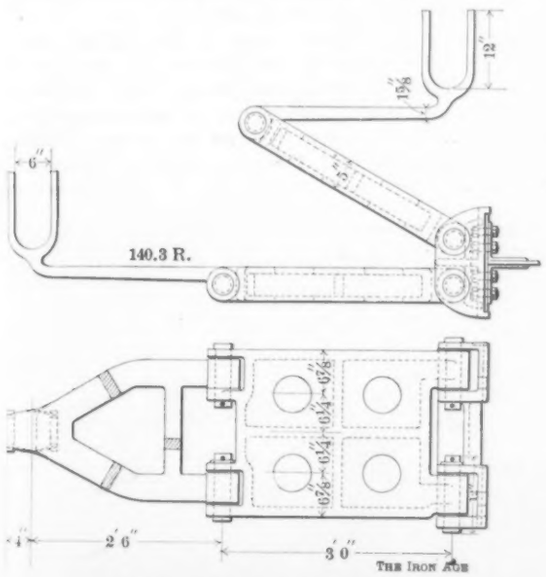


Fig. 19.—Bracket for Carrying Riveters.

ises to gain in numbers and influence. As indicating the sentiment in line with Mr. Chamberlain's proposals, it is interesting to observe the view taken of existing trade conditions by such a leader of opinion in the iron trade as the *Iron and Coal Trades Review* of London. The following editorial article, entitled "The Question of the Hour," is taken from the issue of September 4:

If there ever was a question that possessed immeasurable importance for the iron trade, it is surely that which is now occupying the minds of economists, manufacturers, business men and politicians, not to speak of the workingmen, from Land's End to John o' Groats—the question of what, under all the circumstances of the case, is the wisest and the soundest fiscal system to adopt. It was, perhaps, inevitable that there should be serious and more or less hopelessly irreconcilable diversity of opinion as to the issue now before the country. If the *status quo* is to prevail, there must remain a very widespread feeling that things are not quite what they ought to be. Even assuming that it had been clearly demonstrated that free trade was, under all the circumstances of the case, the only fiscal system that was suited to the conditions of the United Kingdom, there would still remain the serious difficulties and dangers inherent in the relations of the colonies and the mother country. It has been more than hinted that if the mother country fails to offer to her children the reciprocity which they now crave for, the days of the Empire are likely to be numbered, on the ground that there is no other suitable bond available whereby to link its constituents together in permanent union. This may be, and, perhaps, is, at the present stage at any rate, an unduly alarmist view. But there is another aspect of the matter that is hardly less important to the fiscal future of the country. It is increasingly recognized that we are in danger from the growing exclusiveness of foreign tariffs, and that this danger can only be met and overcome by taking care that we do not leave ourselves entirely without the means of effective negotiation when we come to make representa-

Fig. 18.—View Showing Five Wall Cranes and Two Traveling Cranes.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

ting with colonial products in British markets may have sustained a check in the retirement of that gentleman from the British Cabinet, he undoubtedly has a following which is not only respectable, but which prom-

tions to foreign countries on tariff affairs. This is a matter which has probably far more interest for the members of the iron and machinery trades than that of a differential tariff in favor of the colonies. Indeed, we are not afraid to go further, and say that it is the only aspect of the whole case that appeals to the iron and machinery trades as being really important.

It has become the fashion in these days to preface every plea or argument in favor of protection by the announcement that the pleader is a free trader on principle, but that the existing conditions do not admit of the practice of free trade principles, and render them, at the best, a costly and perhaps an ultimately disastrous luxury. We believe that few Englishmen like the idea of protection. They have generally far too much grit and independence of spirit to wish for aid from any source whatsoever, if they are only let alone. But, under present conditions, they have not, and they can hardly expect in the future to enjoy, what is to them the ideal situation of being left to follow their own devices, untrammeled by unnecessary and harassing legislation, and unfettered by fiscal barriers designed to exclude them from the world's markets. Let the Englishman have a fair chance and "he fears no foe in shining armor," or in any other guise. We do not seek protection, in the ordinary sense. If we seek relief from the insidious influences of deep laid schemes to injure our trade by entirely unconstitutional means, that is quite another affair. Unless the Englishman is provided with some means of retaliation when such sinister processes are resorted to, he is likely enough to waken up some fine morning and find that he has no trade left worthy of the name. Let no misunderstanding or sophistry obscure the true issue of the case. We do not want to alter our free trade system. There are but few thick and thin protectionists in this country. It is not because we believe protection to be "the more excellent plan" that we feel constrained to plead for some consideration for those who have suffered seriously by free trade, and are likely in the future, if left as defenseless as they have hitherto been, to suffer still more. It is not a question of making bread dearer; that may, and, if possible, should be avoided. It is not a question of renouncing free trade: the patient continuance in free trade orthodoxy may be desired by the majority, but may also be rendered impossible by conditions beyond their control. We know of absolutely nothing that the people of this country could do at present to hinder the Germans and the Americans from coming down like wolves on the fold of our home market and literally stripping it as bare as ever a locust stricken country was stripped of vegetation by invading hordes of those marauders. Last year the Germans sent into our market well over 800,000 tons of iron and steel, and from all sources we drew more than a million tons. Why should not this, in a few years more, rise to 4,000,000 or 5,000,000 tons? Why, indeed, should we be allowed to manufacture iron and steel at all?

The absorbing interest taken in this matter has led us, in to-day's issue of the *Review*, to give to it a large amount of space and attention. We believe that this space and this attention will be appreciated by our readers. We have endeavored, as far as was consistent with the facts, to hold the balance justly between the two opposite economic creeds. We do not believe that there is not much to be said in favor of free trade. There is so much, in theory at least, that is favorable to that system that we can excuse the attitude of the multitude, both in and out of Parliament, who can only find tranquillity and ease of mind by sitting on the fence. We have not willingly come to the conclusion that it is the interest of the iron trade, not necessarily to discard free trade, but at any rate to see to it that, in the dark days that are ahead of us, the opportunity of making a living at all shall not be filched from us by a system that unquestionably tends to help the protectionist at the expense of the free trader, and may, if followed to its ultimate conclusion, end by wiping the free traders entirely out of existence. What, therefore, we regard as fundamental is the power to at any rate adopt a negotiating margin in tariff affairs, so that "whatsoever measure ye mete therewith shall it be meted out to you again." It may be, as some believe, that the invasion of British markets by foreigners is a good thing for British industry. Such an invasion may come once too often—that is, when it has become chronic and irremediable.

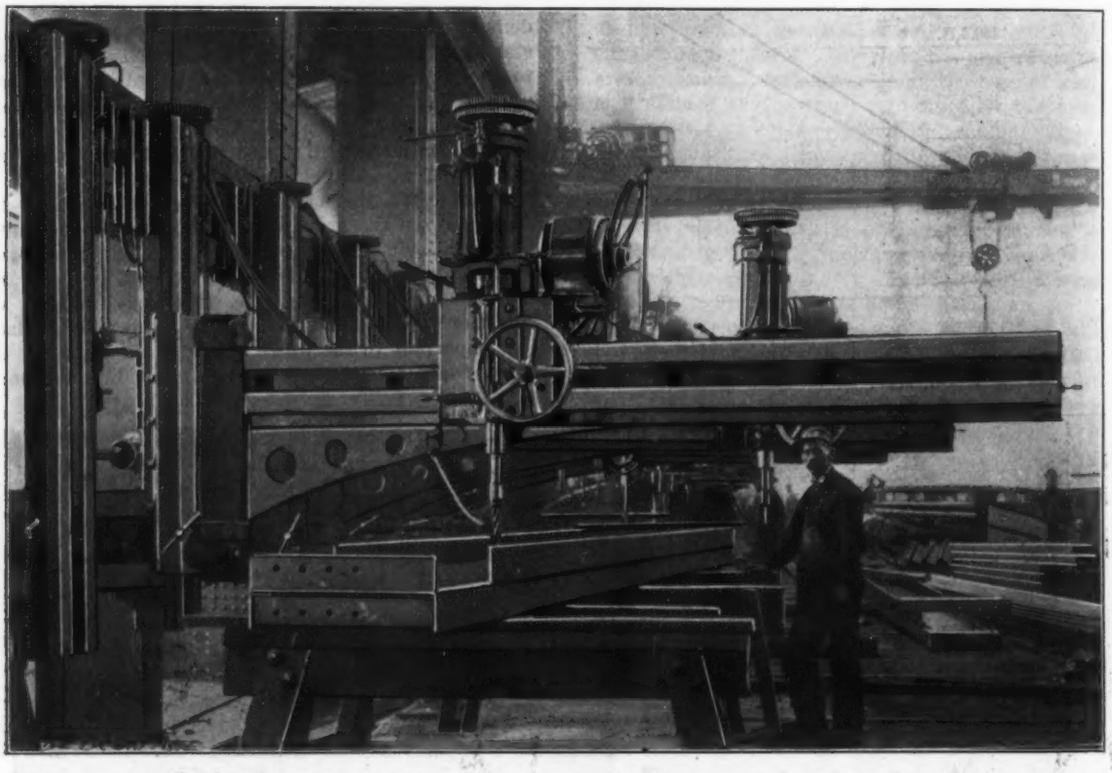


Fig. 20.—Side View of Reamers.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

The Boston *News Bureau* is authority for the statement that the Belle Isle ore of the Dominion Iron & Steel Company, which experts reported to run between 55 and 60 per cent. iron, is actually running less than 50

with a tendency downward rather than toward improvement. On the other hand, the cost of the ore is being reduced. A year ago it cost the company $1.25 per ton delivered, but it is now costing 80 to 85 cents per ton, and the management expects to get it down to 70 cents.

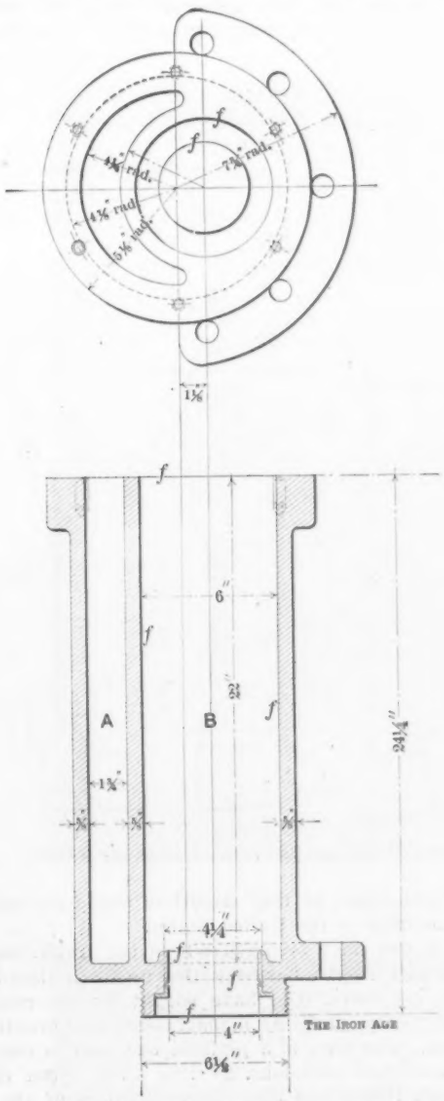


Fig. 21.—Plan and Section of Cylinder.

Labor Conditions in Mexico.

DURANGO, September 14, 1903.—Employers of labor in the United States who periodically suffer from the aggression of labor unions and who look in vain for relief would experience a pleasurable change in their relation to their employees if they chanced to transfer their operations to Mexico. The "walking delegate" has not yet arrived here, unless, indeed, the American tramp, many members of which class winter in the larger cities, may be said to be his prototype. Strikes are frowned upon by the laws of the land, and any movement at all resembling them is rare. It is true that occasionally enterprises under the management of citizens of the United States, such as some of the railways, where large numbers of workmen of the same nationality are employed, are embarrassed by actions on the part of the latter closely resembling a strike, but in these instances the disaffected employees evade the consequences of their conduct by the ruse of exercising their right to resign, which they do by preconcerted agreement. As every man has a right to cease working when he so desires, unless bound by a definite contract, the law cannot, of course, be brought to bear in such cases. Even then, however, the

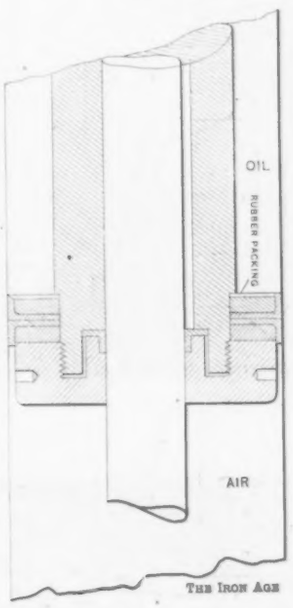


Fig. 23.—Spindle Packing and Air and Oil Chambers.

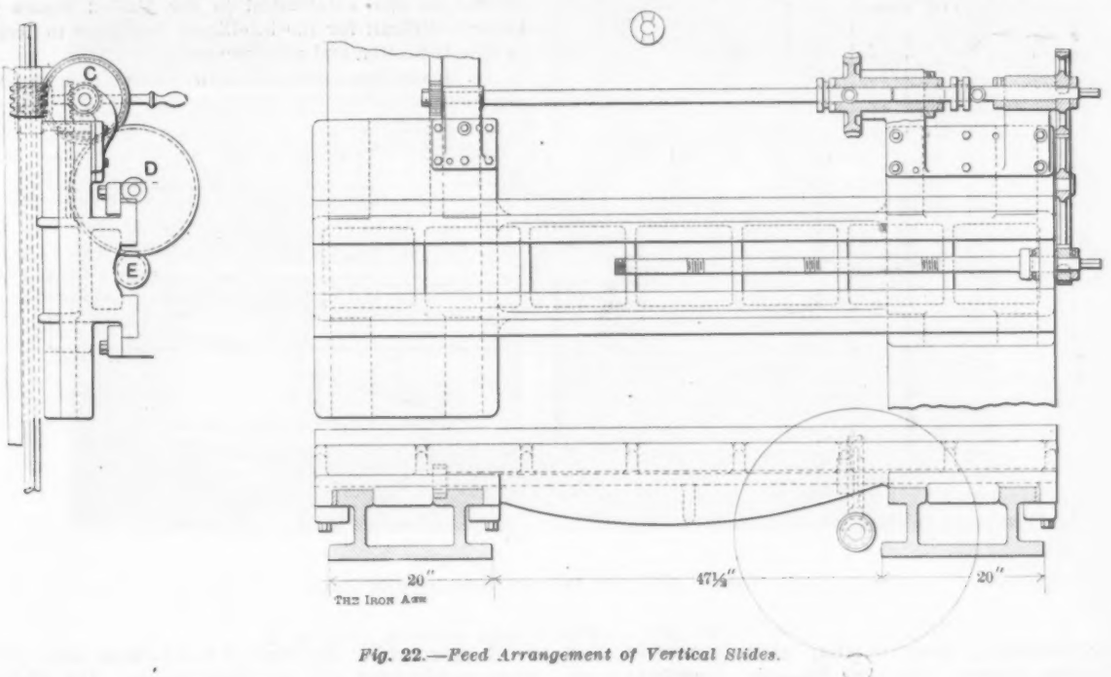


Fig. 22.—Feed Arrangement of Vertical Slides.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

"resigners" are very careful to refrain from any action savoring of intimidating methods toward the men who take their places. Picketing, or coercion in any form, is not tolerated for a moment, nor is it ever attempted. It is not surprising, therefore, that labor disputes are few and easily adjusted when they do occur. Unable to avail themselves of the aids upon which their *confrères* in the United States chiefly depend to enforce their demands—*i. e.*, intimidation of those who seek to supersede them, and wanton destruction of property, disaffected workmen here are slow to make unreasonable demands upon their employers. Workmen who belong to unions domiciled in the United States endeavor to live up to the rules of their orders, but they are very chary of running up against the law by fomenting a strike when they think

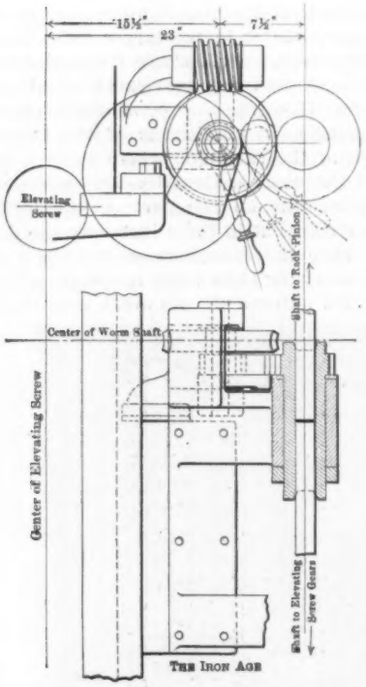


Fig. 24.—Reversing Mechanism.

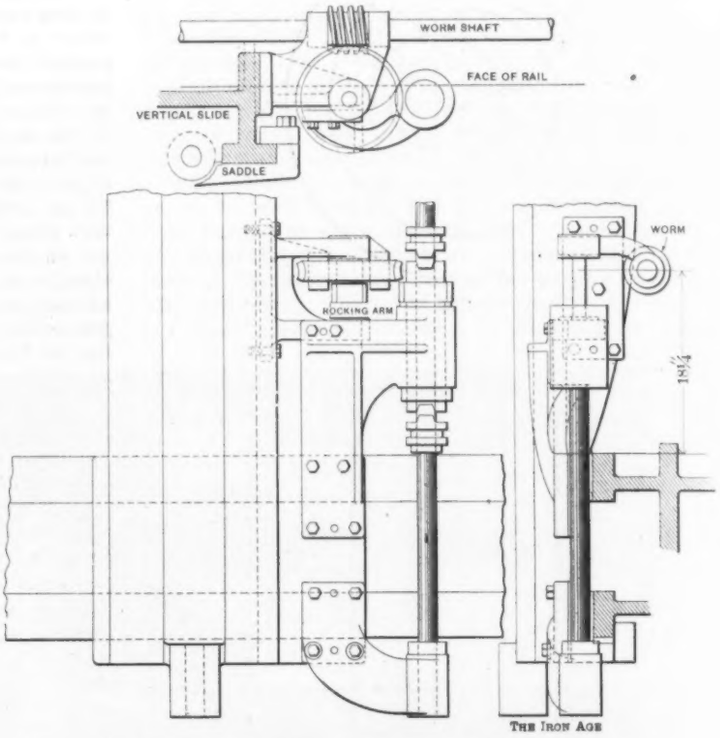


Fig. 26.—Moving Mechanism for Vertical Slide and Saddle.

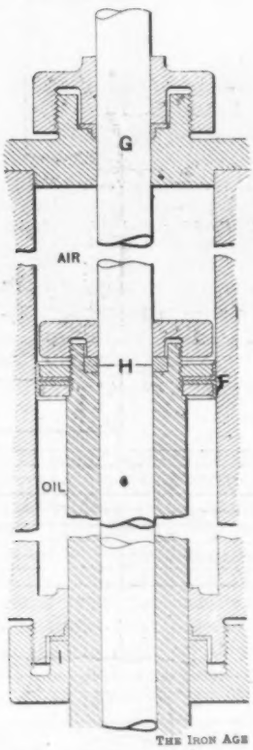


Fig. 25.—Section through Cylinder.

they have cause, as they doubtless would do under like circumstances in the United States.

Instances have occurred where the traffic, both passenger and freight, has been tied up for a time by locomotive engineers, who have sought by the resignation method to force railway managements into granting concessions. The plan is a perilous one, and is resorted to only upon rare occasions, as none know better than the workmen themselves that the authorities of the nation have no sympathy whatever with that system which has become so well established in the United States as to make it difficult for the intelligent foreigner to decide as to who is master and who servant.

In Mexico employees generally entertain a respect al-

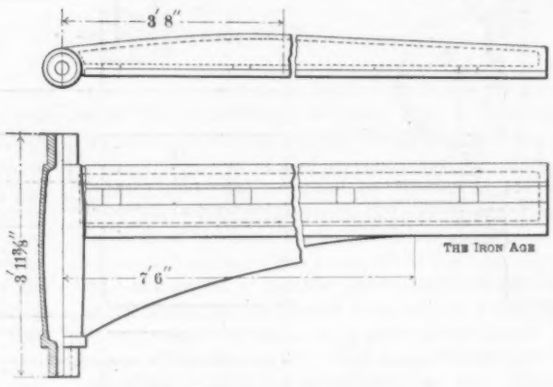


Fig. 27.—Arm of Reamer.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

most approaching reverence toward those who furnish them employment and pay them wages. The wishes of their employers are laws to Mexican workmen, who never assume to question their employer's right to the profits which their own labor may have been a factor in creating, providing that the stipulated wage rate is regularly paid. This sense of respect and gratitude is a survival

of old time conditions, when the avenues of employment were few and the laboring people were in a great measure dependent upon the bounty of the rich land owners.

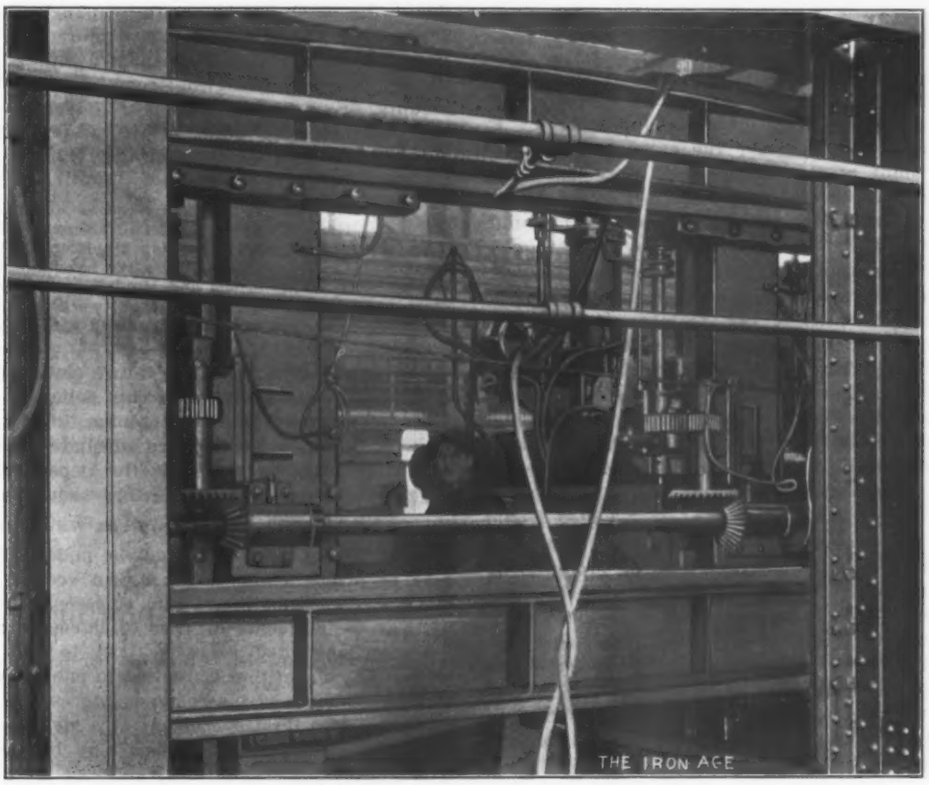


Fig. 28.—Rear View of Reamers.

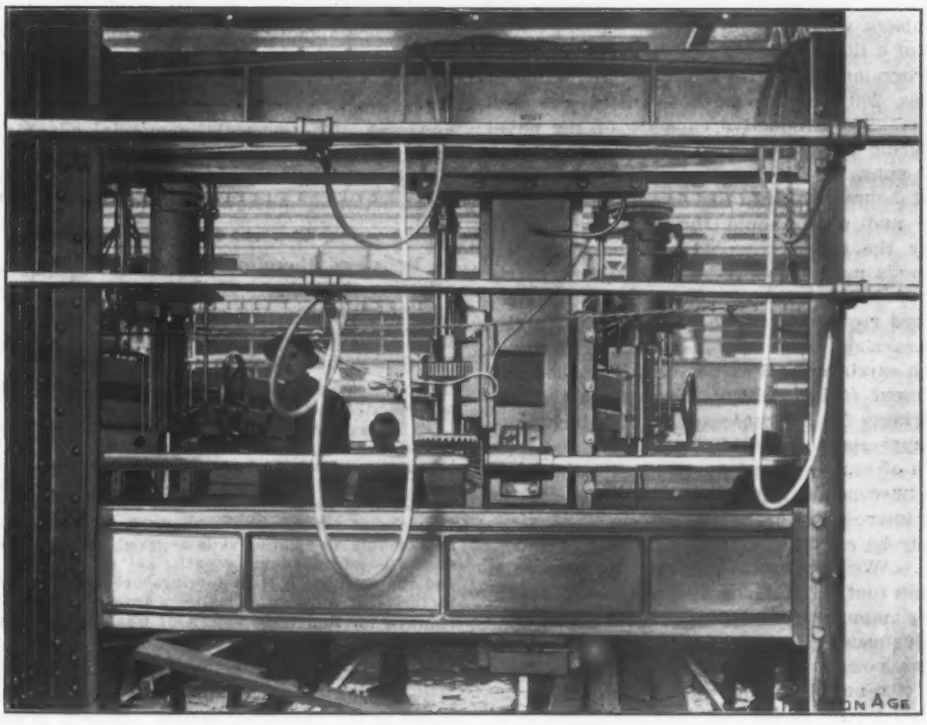


Fig. 29.—Rear View of Reamers.

A MODEL BRIDGE AND CONSTRUCTION SHOP.

Societies exist among the workmen in the different trades here, but their objects are purely benevolent and fraternal. J. J. D.

The use of compressed air for the operation of pneumatic tools has become a prominent feature in the economics of large manufacturing establishments. Especially is this true of the shipbuilding industry. At each of the larger American ship yards several hundred pneumatic tools are now in use. At the plant of the New York Shipbuilding Company, in Camden, N. J., there are now in use about 400 portable riveters, calkers, drills, &c. An air pressure of 110 pounds per square inch is carried, supplied by an air compressor capable of delivering 5000 cubic feet of air per minute.

The Naval Gun Foundry.

A Special Board Recommends Important Extensions.

WASHINGTON, D. C., September 22, 1903.—The special board, composed of Capt. William M. Folger, Commander J. M. Bowyer and Lieut.-Commander F. F. Fletcher, appointed to consider the enlargement of the gun factory plant at the Washington Navy Yard and to make recommendations with regard to the general policy of the Navy Department with respect to the building of guns by the Government and by private contractors, has filed its report with Secretary Moody, through whose courtesy the correspondent of *The Iron Age* is enabled to present the abstract given below. Summarizing the conclusion of the board, it may be said that the existing factory is found to be wholly inadequate to the present requirements of the service, and the board recommends the enlargement of the plant, at a cost of $4,182,393, "to a degree that will enable it to produce all the guns of the main battery and one-half the guns of the secondary battery of the ships annually appropriated for." The adoption of this policy would result in the manufacture by the Government of a large number of guns which would otherwise be produced by contract with private firms in order to equip the war vessels authorized by Congress as rapidly as they are completed. Secretary Moody will submit the board's report to Congress, and the naval committees of the two houses will decide the question as to whether the Government shall manufacture all the naval ordnance or whether a part shall be built by private establishments. Following is an abstract of the board's report:

Present Capacity.

During the last six years Congress has provided for 15 battle ships and 4 monitors, 3 armored cruisers and 9 protected cruisers, which is equivalent in battery power to an average of a little more than three battle ships per year. This programme has called for the production of 76 12-inch guns, 200 8-inch guns, 354 6-inch guns and 554 3-inch guns. The productive capacity of the naval gun factory during the same period has been 48 12-inch guns, 96 8-inch guns, 180 6-inch guns and 360 3-inch guns. Working eight hours per day, the deficiency would be nearly treble, and even should the plant be run 24 hours per day the capacity would still be much less than the demands made upon it by the average yearly appropriation of Congress. A comparison of the number of gun carriages required with the productive capacity of the present carriage shops shows a shortage of 40 per cent. in 12-inch carriages and 88 per cent. in 8-inch carriages, the present facilities being adequate to the production of carriages for the necessary 3 and 6 inch guns.

It will be appreciated on general principles and from a consideration of the results of working extra time that this system is uneconomical and disadvantageous for the Government's interests from a business point of view, and should only be employed under conditions of exceptional gravity. Working extra time is expensive, and it is improbable that it is of the best quality in manufacture. The manufacturing plant deteriorates more rapidly. Adjustments and replacements are more frequent. The power plant deteriorates even more rapidly than the manufacturing plant, as it has no period of rest for repair, except Sundays and public holidays. It is merely a question of time when a universal collapse is the result. Labor employed at night is not as efficient as that employed by daylight.

It is, however, practicable to utilize automatic and partially automatic machinery for much of the work of production, and as the disadvantages of 16 hours of idleness for the plant are likewise obvious, the gun factory has wisely employed such machinery in a large portion of its night work. The board finds itself obliged to recommend that this practice of working 16 hours be continued in the scheme of enlargement in view of the present excessive demand upon the factory.

It is thus apparent, in view of the probability of a constantly increasing discrepancy between output and demand upon the resources of the gun factory, that the Department is confronted with the alternative of abandoning its policy, so successfully inaugurated, of official supervision and control of the manufacture of the more important features of the armament of our war ships—namely, the assembling and completion of the guns and mounts, or the consideration of a serious increase in the manufacturing plant of the gun factory. A communication from the Chief of the Bureau of Ordnance states:

> While I think there are many reasons why it would be preferable for the Government to do all its gun and mount work, there are good reasons for having a portion of it done by contract, and the latter course gives the benefit of plants already erected, such as Bethlehem and Midvale, which, with very moderate enlargement, can at once begin work, as they have most of the essential tools, fine buildings and a skilled force at their command.

It is apparent that the future development of the factory depends solely upon this policy of the Department. The board is of the opinion, in a general sense, that in regard to items where adequate and satisfactory competition may be obtained (the Department to be the judge), the product of the factory should be limited.

Advantages of Government Manufacture.

The advantages of production under official control may be briefly enumerated: 1, An accuracy of adjustment in the assembling of guns so essential to the mathematical requirements of their construction; 2, a check upon an unwonted excessive cost to the Government where the competition is limited to one or two manufacturers, who may have a common interest; 3, the capacity to produce for the Government at a given moment when the full resources of the shops may be turned on, for it is conceivable that circumstances of labor controversy at the works of private manufacturers might cause the cessation of all Government work at an epoch of supreme necessity, and, 4, the obvious benefit of an intimate connection between an official manufacturing plant and the experience and work of the *personnel* of the fleet.

The advantages to the United States of the manufacture by private parties where the control of the character, quantity and prices of the product is assured are apparent. The general commercial advantage to industry in its relation to our foreign trade of such manufacturing plant is also recognized as contributing to the construction by outside parties of a completed war vessel.

General Recommendations.

In view, therefore, of the various considerations affecting the subject of the construction under complete official control of the armament of our war vessels, the board has to recommend as to the ultimate capacity of the Government factory as follows:

1. The normal output should be by one shift of men working as prescribed, eight hours.

2. It is observed, during the period of active reconstruction of the navy comprised within the past six years, that Congress has appropriated funds for building four large vessels per annum, or their equivalent in large vessels and cruisers. It is assumed by the board in its recommendations that this may continue to be the rate of construction authorized for the immediate future, and on this assumption it is believed that the machinery plant should be of an annual capacity, at eight hours' labor, to per- and the completion from forgings procured from private manufacturers of all guns of calibers from 12 to 6 inches inclusive required for four large vessels of war, battle ships or first-class cruisers.

3. The forging plant should be increased to a capacity to permit the production from billets or ingots purchased from private industry of forgings of sizes applicable to what is known as the "secondary battery" calibers, in annual quantity to be equal to 50 per cent. of the requirements for four vessels of war of large size, battle ships or first-class cruisers.

4. The foundry plant to be of a capacity (including products of steel as well as brass) to permit the casting of small objects which would profitably replace such material now made of brass, and at the same time utilize the scrap product of the factory at present disposed of disadvantageously by public sale. The board is of the opinion that the present practice at the factory of placing all orders for large castings for mounts with private parties is a wise one, there being ample competition for the protection of the Government.

5. There should be provided such additions to the power capacity as will most efficiently meet the demands of the increased plant above described.

6. The board is of the opinion that the United States should

acquire about 12 acres additional territory contiguous to the present limits of the Navy Yard.

The board recognizes that this development of the gun factory cannot be undertaken at this time or with funds provided by a single appropriation by Congress, but recommends that such ultimate extension be adopted in principle.

Estimates of Expenditure.

The following items of extension, enlargement and increase to be adopted are recommended by the board: Building for power plant extension, $135,964; coal storage and handling plant, $19,084; electric power plant extension—building, $97,983, machinery, $205,200; foundry—building, $300,170, machinery, $121,075; fire proof pattern storehouse—building, $156,000, machinery, $6000; storage bins for building material and scrap metals, $12,000; storage bins for foundry material, $39,412; pattern shop—building, $300,160, machinery, $35,000; steel timber shed, $40,320; fire proof general storehouse, $289,152; forge shop No. 2—building, $134,937, machinery, $148,000; gun shop No. 3—building, $190,800, machinery, $368,930; locomotive house—building, $61,747, machinery, $12,000; extension of east and west gun carriage and erecting shops—building, $334,448, machinery, $666,232; extension of gas plant, $9961; ordnance office building No. 2, $414,720; alterations and new roof for store No. 10, $68,346; fire and telephone station, $14,752; total—buildings, $2,619,956; machinery, $1,562,437; grand total, $4,182,393. W. L. C.

Scientific and Technical Notes.

In a printing establishment in New York City two motors are in use, a 15 horse-power gas engine and a 25 horse-power electric motor. The average load carried is only about 10 horse-power. Comparison has been made two months, when the gas engine alone was used, and two other months, when the electric motor alone was in service. Gas is taken from the city illuminating mains and costs $1.05 per 1000 cubic feet. The engine was run a total of 697 hours, and the gas consumed cost $106.68, or an average of 15.3 cents per hour, which is about 1½ cents per horse-power hour. Electric current is taken from the Edison mains, and the amount used during the 686 hours of operation of the motor amounted to $250.30, or an average of 36.5 cents per hour, which is about 3½ cents per horse-power hour.

Results recently obtained by lamps using osmium filaments showed a consumption of 1.5 watts per candle power at first, gradually reduced to 1.32 watts, at which figure it remained constant to the end of the 1200 hours covered by the tests. The candle power curve for this lamp showed that it commenced to give about 14½ candle-power, rose in the course of 300 hours to 16.8, and then fell in a practically straight line to 15 candle-power at 110 degree hours. So far the great drawback to these lamps is that they can be used only for low voltages, which requires them to be burned in series.

A recent investigation into the question of the relative cost of running trains at high speeds, as compared with low speed, has developed the fact that an increase in speed from 32 to 48 miles per hour, or 50 per cent., accompanied by a decrease in the number of cars per train from seven to four, has resulted in an increase in absolute coal consumption of 12 per cent., or about 90 per cent., when figured on the basis of the number of cars, which, of course, represents the earning capacity.

In Massachusetts the expense of manufacturing electric current for lighting purposes has decreased from 58.4 per cent. of the total expense in 1891 to 49.1 per cent. in 1901; the cost of distribution has increased from 20.5 to 24.1 per cent.; the cost of management has increased from 9.1 to 13.0 per cent.; miscellaneous expenses have fallen from 7.0 to 5.9 per cent., while taxes have risen from 4.7 to 7.6 per cent. It is thus seen that while the cost of management has increased by 3.9 per cent. of the total expense account, the cost of the manufacture of the product has at the same time decreased by 9.3 per cent. thereof. This would seem to be a convincing argument in favor of securing and retaining competent officers by offering them a sufficient inducement.

The largest locomotive building establishment in the world, the Baldwin Locomotive Works of Philadelphia, has now 17,000 men at work, 15,000 in Philadelphia and the remaining 2000 at Burnham, Pa., where the frames and other heavy parts of the locomotives are built. It is reported that their full capacity for the next 12 months will be taxed to take care of the contracts now on hand.

The Iron and Steel Institute's Decision to Visit America.

The London *Iron and Coal Trades Review*, in its report of the Barrow meeting of the Iron and Steel Institute, states that Charles Kirchhoff, editor of *The Iron Age*, addressed the Institute in behalf of a committee formed in America to arrange for a second visit to be made in the fall of next year and that he had brought with him a series of letters indorsing this invitation from the leading engineering societies of America, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the Franklin Institute of Philadelphia, the Foundrymen's Association of the United States and others, together representing about 10,000 very busy men, who would join them in pledging the Institute that they would do everything in their power to make their visit profitable and a pleasant one. The invitation was unanimously accepted, and in announcing the fact President Andrew Carnegie made the following remarks:

You have had your invitation acted upon and carried unanimously. It is accepted. I seem to live in a strange kind of atmosphere. I received the Iron and Steel Institute as chairman of the committee in New York. Little did I dream that I would be transformed—shall we say reformed—from an American into the president of the Iron and Steel Institute, and now, as your officer, I am to be received by those Americans in my position of British president. That seems to be most appropriate, because on this island I first drew the breath of life, and I spent my manhood and boyhood across the Atlantic, and they are to me the same. I find no inconsistency in being loyal to both. The man who forgets his mother, what would you think of him? Therefore, gentlemen, I live in this strong attitude. My leading aspiration, the hope and longing of my heart, is that the Briton should know his children—the Americans, and that the Americans should know the Briton. Therefore, I think the coming of the Iron and Steel Institute to America is an international event, pregnant with beneficent results. I am delighted that you are coming over. I shall try and forget that I am not one, only a New Yorker, receiving distinguished guests, but I am one of the distinguished guests. I have the greatest difficulty in distinguishing between Mr. Brough, your secretary, and Mr. Kirchhoff, and I sit down and tell Mr. Kirchhoff that he must bear with Mr. Brough in some way, and I find that I am talking to Mr. Brough himself, and then to the other with the same result. Believe me, fundamentally the American and the Briton are just as alike as those two men. Those two men have apparently known each other, and if they had not corresponded with each other they would have been jealous; but they know each other and are friends; and all that you want to do to be friends with Americans is to know them, and all they need to be friends with you is to be friends with me and I shall know both and love you both and so we will love each other. I wish to say this about Mr. Kirchhoff: Things grow in America as they do here. The young men come to the front, and it has been a matter of congratulation (and I only mention it again because Sir James Watson, Mr. Whitwell and others noticed it). They see a class of young men coming to the front in this Institute, which gives them an assurance that it has a continued career of usefulness. We are very much struck with the brilliant young men. Now, Mr. Kirchhoff was secretary of the committee which received you in America. To-day he is chairman and holds a leading po-

sition among his fellows. He will receive you as chairman of the committee when you land in New York. With reference to your vote of thanks, if I had words to express my feelings, I would thank you for the great honor you have done me in electing me to the highest position, as Mr. Kirchhoff has truly said, for a man, as far as iron and steel are concerned. I thank you very much for saying that I have not failed, and that I have at least, as far as I am able, preserved the prestige of the Iron and Steel Institute ,and it is one of the proudest satisfactions of my life.

Amendments to Mexican Patent Law.

DURANGO, September 16, 1903.—In conformity with the authorization given the executive to amend the laws affecting patents and trade-marks in the directions indicated in a message submitted to the Chamber of Deputies some months ago, and printed in *The Iron Age* of May 14, laws have now been promulgated for the purpose indicated, and will become effective October 1. Following are the principal provisions of the patent law:

Patents are granted for 20 years. That period is divided into two, the first being one year and the second 19 years. The Government fee for the one year patent is 5 pesos; for the remaining 19 years, 35 pesos. These fees are payable in revenue stamps.

Patents will be granted without prejudice to a third party and without guarantee as to their novelty or utility. They, however, constitute a presumption as to those qualities and of the legitimacy of the rights of the patentee until the contrary is proved.

Patents will be issued with the least possible delay, and their date will be the date of the legal presentation of the application.

A simple power of attorney will enable one person to act for another in the obtaining of a patent. In consequence powers from abroad for patent purposes need not be protocolized.

The manufacture of patented objects and the employment for a commercial or industrial purpose of patented methods, without the consent of the owner of the patent, will be punished with a fine of from 500 to 2000 pesos, and with one to three years' imprisonment, or with either penalty at the discretion of the judge.

Patents for designs and models may also be obtained for five or ten years, the Government fee in the former case being 5 pesos, and in the latter 10 pesos.

The law contains provisions whereby both existing patents and pending applications may be made conformable to it.

The patent office will publish an official gazette of patents and trade-marks in which patents and trade-marks and all concerning them will be described.

In order to acquire the exclusive right to the use of a trade-mark it is necessary to register it in the patent and trade-mark office, by complying with the formalities set forth in the law and rules of practice.

Any one, whether Mexican or foreigner, may register a mark to which he is legitimately entitled. The application may be made directly by the owner of the mark or by another acting as attorney for him. An attorney can be appointed by a simple letter of authorization signed in the presence of two witnesses who must also sign.

Trade-marks are granted for 20 years, but may be renewed by payment of a new fee at the expiration of each period of 20 years, for 20 years longer, making them practically perpetual.

The registration and renewal fees are $5.

Marks, in addition to their distinguishing features, must contain the words, "Marca Industrial Registrada," or "Marca de Comercio Registrada." These designations may be abbreviated as follows: "M. Ind. Rgtrda" and "M. de C. Rgtrda."

A penalty of one to two years' imprisonment and a fine of $100 to $2000, or either penalty, at the option of the judge, will be imposed upon the person who applies, to articles which he manufactures or sells, a trade-mark which is already legally registered on behalf of another person for the purpose of distinguishing similar articles.

The owner of a commercial name has the exclusive right to use it without the necessity of registration or any other formality; and for the exercise of this right he will have, as against the person who usurps or imitates it, the right of civil action as well as of penal action.

Any merchant, whether Mexican or foreigner, is entitled to have his commercial name published in the official *Patent and Trade-Mark Gazette* in order to obtain the advantage mentioned below. In order to retain this advantage it is necessary to renew the publication every ten years.

He who in any manner makes use of a commercial name which does not belong to him shall be liable to the penalty of major arrest and a fine of the second class, or either penalty, at the option of the judge.

The same penalties shall be meted out to him who imitates a commercial name in such a manner as to produce confusion.

In order to impose the above penalties it will be necessary for the plaintiff to prove malicious intention on the part of the guilty party. Nevertheless the merchant who has caused his commercial name to be published in the official *Patent and Trade-Mark Gazette* will be exempt from this requirement, and the legal presumption will be that the defendant acted with malicious intent.

The law will also protect commercial houses that make use of announcements or advertisements that are characterized by a certain originality distinguishing them easily and sharply from other advertisements of the same kind. Such advertisements may be protected for periods of five or ten years.

The Government fee for the publication of a commercial name is to be 1 peso; for the registration of a special form of advertisements for five years, 2 pesos, and for ten years, 4 pesos. J. J. D.

The Consolidated Lake Superior Company's Affairs.

After a protracted meeting in New York on September 21, the directors of the Consolidated Lake Superior Company adjourned without adopting any plan to save the company from bankruptcy and reorganization. Among the directors of the company nothing else than a forced sale of the securities the bankers hold is expected. It is understood that the loan agreement provides that Speyer & Co. may sell the securities at public or private sale, in which case they can, if they choose, acquire all the property of the concern for the amount of the loan, plus the underlying liens and the liens of laborers and contractors.

Charles H. Tweed of Speyer & Co., when informed that the directors had given up hope of paying the note, said: "We have tried to help the company out as far as it lay within our power to do so. Our course now will be to sell at public auction the assets, consisting of securities of the subsidiary companies pledged under the collateral note. These securities will be put up at auction and sold, and the syndicate will be reimbursed from the proceeds. We have no plans for the operation of the company in the interim, as that is not, of course, a part of our business, and in fact we have not decided on the time or condition of the public sale."

As roughly estimated by Vice-President Sanborn, the properties are therefore most likely to go for $10,000,000. These are properties against which securities of the par value of $100,000,000 were issued, and in which, according to official statements, $30,000,000 in actual money has been invested. He says: "Speyer & Co. have been most kind and lenient, waiting patiently while we made every effort to rescue the company. It was not their action, but the company's action, that closed down the plants this week. We simply lacked the funds to continue. Already we are one and one-half months behind with our payrolls, and owe, in salaries to officers and wages to employees, about $200,000."

Advices from Philadelphia state that the stockholders are prepared to fight any foreclosure proceedings bitterly. Attempt at foreclosure will be met by a demand for a receiver. But as Speyer & Co. only hold securities, and merely have to sell them, it is not clear that foreclosure will be attempted at this stage.

A press dispatch from Sault Ste. Marie, dated Sep-

ember 19, says: "The shut-down of the Consolidated Lake Superior Company, throwing 3500 men out of employment, has caused a panic in the Canadian Soo, which is in a worse condition than ever before in its history. Many people are preparing to leave the city at once, while merchants are curtailing their stocks and preparing in every way to get through the winter in the best possible manner with the least expense."

Notes from Great Britain.

The Markets.

LONDON, September 12, 1903.—Trade during the past fortnight has been distinctly steadier and prices have slightly hardened. This is due to the advance in the price of imported German steel; 93 shillings is now quoted for sheet bars, while billet quotations are given at from 90 shillings to 92 shillings 6 pence. These are not firm quotations, but even after buyers have secured concessions actual selling prices show a distinct advance on those at which Staffordshire consumers were buying a month ago. The rumored explanation is that the German Association of Billet Makers has been reorganized and its policy revised. The alteration has had the effect of checking the flow of business to Germany and diverting it to British steel makers, whose bookings have, in consequence, improved, while prices have slightly stiffened. This change is to the benefit of the steel makers, but Midland consumers, particularly sheet makers, do not like it. Many of them, however, have placed substantial contracts for some months ahead, in some cases to the end of the year, so that while the cheaper German steel may be off the market so far as quotations are concerned, it will be coming in steadily none the less. It is as well to note that cheap German steel has been the salvation of the sheet trade for the last year.

Pig iron remains very much the same week after week, but there has been some active buying recently and inquirers now find prices for common forge qualities distinctly firm. The termination of the Welsh tin plate lockout has relieved us of some anxiety. Standard quotations to-day are:

Pig Iron: Scotch, 51 shillings 3 pence; Middlesbrough, 46 shillings 3 pence; hematite (W. C.), 55 shillings 4½ pence. Forge qualities: Staffordshire cinder, 47 shillings 6 pence to 48 shillings; part mine, 48 shillings 6 pence to 49 shillings 6 pence; all mine, 60 shillings to 67 shillings 6 pence; best ditto, 75 to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 47 shillings 6 pence to 48 shillings 6 pence; Derbyshire, 49 to 50 shillings; North Staffordshire, 50 to 51 shillings; Lincolnshire, 52 shillings 7 pence. Public stores stocks, in tons, on September 10:

Connal's, at Glasgow	12,648
Ditto, hematite	300
Connal's, at Middlesbrough	134,600
Hematite (West Coast)	16,772

Finished Iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s 6d.; second grade, £7 10s.; common unmarked bars, £6 5s. to £6 10s.; North Staffordshire bars, £6 10s. to £6 15s.; angles, £6 15s. to £7; sheets, singles, £7 2s. 6d. to £7 5s.; doubles, £7 5s. to £7 7s. 6d.; trebles, £7 17s. 6d. to £8; galvanized corrugated sheets, f.o.b. Liverpool, £11 to £11 5s.; hoop iron, £6 17s. 6d. to £7 2s. 6d.; nail rod and rivet iron, £6 12s. 6d. to £6 15s.; gas strip, £6 10s. to £6 12s. 6d.

Steel: Bessemer billets, £4 12s. 6d. to £4 15s.; Siemens billets, £4 15s. to £4 17s. 6d.; mild steel bars, £6 7s. 6d. to £7 2s. 6d.; steel plates, £6 10s. to £7 10s.; steel girders, £5 15s. to £6 5s.; steel angles, £5 10s. to £6 7s. 6d.

The Bolckow-Vaughan Dividend.

The profit available for dividend of Bolckow, Vaughan & Co. for the last financial year, and after providing for depreciation, is £278,747. In addition to this, the balance brought forward was £68,912, giving a disposable surplus of £347,660. After providing 5 per cent. on the preference shares and 5 per cent. on ordinary shares, £140,750 is appropriated to expenditure on various extensions, new plant and machinery, and the amount carried forward is £45,990. The total expenditure on new collieries, new plant, machinery and extensions during the year amounted to £328,916, of which £188,166 went to capital expenditure.

At the statutory meeting of the shareholders, the chairman in moving the adoption of the report made some interesting comments upon the present situation. Referring to capital expenditure, he said the shareholders had been informed at previous meetings how necessary it was that their blast furnace plant should be improved, owing to the severe competition from America and the Continent. The directors were constructing, under the superintendence of the best American expert, two blast furnaces with all the most modern improvements. These would enable them to convert their surplus ironstone into pig iron, and as their output of Cleveland ironstone amounted to 2,000,000 tons per annum, which would last for many years, the shareholders would agree that this expenditure was wise.

Their investments had been increased through the acquisition of a one-third interest in mines in the south of Spain. The supply of iron for making the highest class of steel was a problem which was troubling ironmasters generally. The directors believed that the mines in which they had acquired an interest would give the company a good and immediate supply of Bessemer ore. Their action in this matter had been rendered necessary by the rapid working out of the deposits in the north of Spain. It was not wise to prophesy as to what was in front of them, but the shareholders might draw some comfort from a statement made to him by Mr. Carnegie last week. Mr. Carnegie told him that America would not be able to produce steel as cheaply in the future as it had done in the past, and that the days of very low cost of production there had gone by. One shareholder had asked when the "exceptional expenditure" would cease. If he meant the outlay upon new pits and blast furnace plant the chairman hoped that in two years the directors would have very clearly in sight the termination of that sort of expenditure, but if he regarded the money spent upon extensions of plant and new processes and upon keeping the works and collieries in the most up to date condition generally as exceptional expenditure, the directors could only say that in these matters there was no finality.

The Weardale Steel, Coal & Coke Company.

The Weardale Company for the year ending June 30 made a profit of £110,248, which, with balance brought forward, leaves £150,000 for disposable dividend, which is 6 per cent. on deferred ordinary, reserve for depreciation £35,000, reserve for general purposes £20,000 and carrying forward £34,178.

The Development of the Turbine.

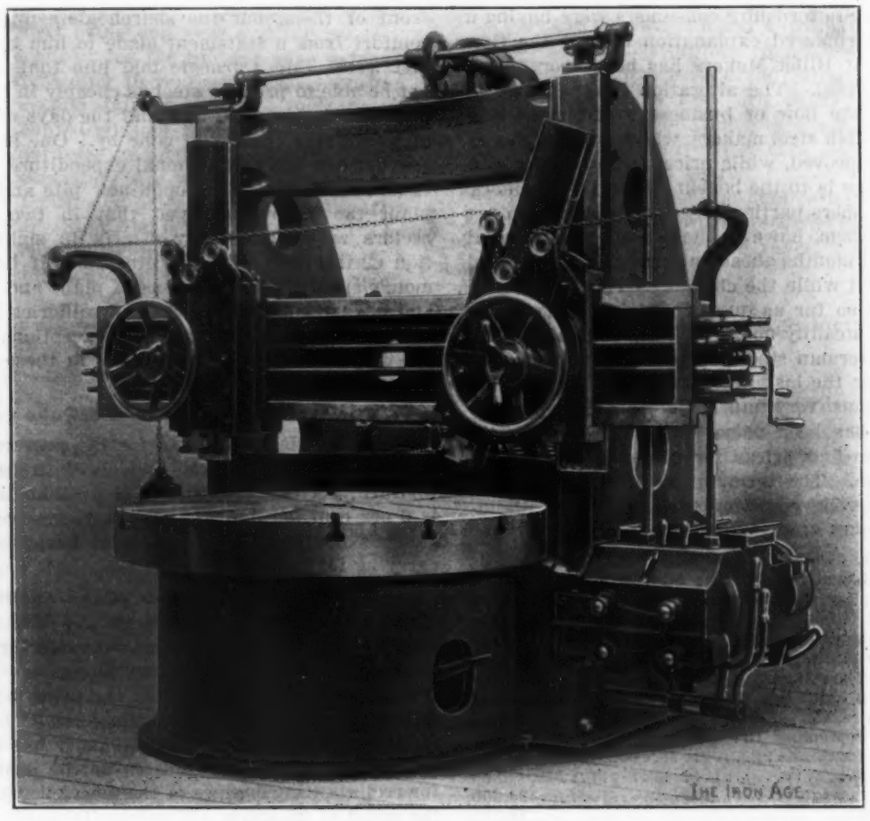
It is reported with more or less authority that the Cunard Company are seriously considering the adoption of steam turbines in their new steamers. They have, of course, come to no decision on the point, but it is known that an influential section among the Cunard engineers favor the scheme. A serious difficulty has been raised in connection with the dimension of the shafting required for reciprocating engines of the power necessary to insure the speed of 25 knots. Firms in Germany, as well as in Britain, have been consulted. With the turbine this difficulty would be entirely removed, for one feature of this system is the light shaft required. But, over and above this, the weight of turbine machinery would be very much less. With reciprocating engines the weight of machinery for the high power must exceed 10,000 tons, and if 3000 tons or so could be saved it would be possible to reduce the size, displacement and cost of the ships without affecting their revenue earning capacity, for the accommodation could be the same. S. G. H.

Drawback on Steel Rails.—The Treasury Department has decided that on the exportation of steel rails manufactured by the Maryland Rail Company of Cumberland, Md., wholly from imported scrap steel rails, a drawback will be allowed equal in amount to the duties paid on the imported materials so used, less the legal deduction of 1 per cent. In liquidation, the basis for allowance will be the net weight of the steel rails, to which may be added 3 per cent. of such weight to compensate for the loss in the manufacture thereof.

The second annual convention of the Master Steam Boiler Makers' Association will be held at the Palmer House, Chicago, October 7 and 8. A large attendance is expected, including boiler shop superintendents, foremen, assistants and layers out.

The Rogers Boring and Turning Mill.

The Rogers Machine Tool Company of Alfred, N. Y., have redesigned their line of vertical boring and turning mills. The new 62-inch mill, here illustrated, is self contained, has no outside works and contains several new features. It is a powerful machine, intended for the use of high speed steels. One important characteristic of this tool is that it can be changed from belt to motor drive very easily, as the driving mechanism is composed of a cluster of gears so proportioned as to give a greater range and more speed changes than were formerly obtained by the use of a cone pulley. The change from belt to motor drive is accomplished by replacing the drive pulley with a gear, as shown in the rear view, Fig. 2. The motor is mounted on a bracket fastened to the frame. The table is supported by a spindle with a V-shaped bearing of large diameter. The foot brake, which enables the operator to stop the table in any desired position, is one of the features which has been retained from the earlier machines. The cross rail has a belt lift so arranged that only the pulley shaft need be run when raising or lowering the rails. Positive geared feeds are used, which are operated by levers, and each head is independent in amount and direction of feed. The machine can be fitted at any time with a screw cutting or drum grooving attachment. A 12 to 18 horse-power motor is used on the 62-inch head mill, the size of motor being governed by the work which the mill is required to handle. There are 24 changes of speed, from 20 to 800 feet per minute on a 62-inch circle, and 12 changes of feeds on each head, ranging from 1-36 to ¾ inch horizontally, and 1-54 to ½ inch vertically.



THE ROGERS BORING AND TURNING MILL.

Lower Prices for Railroad Cars.—The competition for an order of something over 2000 freight cars, which was placed in St. Louis the first of this week, says the *Railway Review*, indicated an eagerness on the part of manufacturers which has not been usual for several years. The decline in the price of some kinds of materials made it certain that lower prices would be made on the cars. It is stated by good authority that the cars were let at prices about $100 less per car than it would have been necessary to pay six months ago. Part of this is undoubtedly represented by market prices of materials and part by a sacrifice of profits. Whether the condition will remain permanent is doubted by many of the best informed among both buyers and sellers.

Advances in Electro-Metallurgy of Iron.

NIAGARA FALLS, N. Y., September 19, 1903.—While the fourth general meeting of the American Electrochemical Society, held at Niagara Falls last week, was not largely attended, it was a most successful convention, the papers and discussions proving of much interest. The convention was held in the Cataract-International Hotel.

When the general meeting was convened the president, Dr. Jos. W. Richards, announced that 35 new members had been elected this month, making the total membership nearly 600. He also reported about $2000 cash on hand, and stated that an arrangement had been made with the Faraday Society of England whereby there would be an exchange of transactions; that in the future members would receive the *Electrochemist and Metallurgist* monthly free in exchange for copies of the transactions of the American Society. Local sections are to be organized, and monthly meetings held by them.

While numerous papers were read and discussed, the paper of most interest to our readers was that presented by Marcus Ruthenburg, entitled "Advances in Electro-Metallurgy of Iron," in which Mr. Ruthenburg said:

"At the last meeting of the society, which unfortunately I could not attend, through the courtesy of our secretary a paper was read for me upon the 'Electro-Metallurgy of Iron and Steel.' In the discussion which followed the reading of the paper, as well as in the technical press of this country and Europe, there has been a mild skepticism as to the possibility of competing with the blast furnace in the production of iron, and the further reduction of this iron into steel by the Bessemer converter or the Siemens furnace. It is noticeable that, without exception, these criticisms have been not by men practical in the manufacture of iron or steel, but by that class of scientific *dilettante* who assume, with an array

of figures and formulas, to prove with equal facility either side of a question that their sympathies happen to be enlisted upon.

"The truth of the blast furnace is that it is a highly economical device for accomplishing its end, and will continue to be so until methods be found that will perform its functions for less money. Some classes of ore may now be more cheaply reduced to metal by other means than the blast furnace, making a product the analysis of which cannot be produced in the blast furnace at all. Given a magnetic ore carrying gangue, sulphur and phosphorus in prohibitive quantity for making good steel economically, such ores find no market tributary to the blast furnace. On the other hand, such ores can be crushed, magnetically concentrated, electrically smelted and produce the best steel at a price which can compete with an ideally situated blast furnace.

"In last year's paper I made the assertion that the work of the electric furnace was performed upon a ton of ore with something less than 500 kw. hours of energy. Upon this basis one of our learned members accorded me an efficiency of 83 per cent., which he followed up by saying that it was impossible. In truth, at that time I was doing 10 per cent. better than that, or an efficiency, according to his figures, of 91.3 per cent. To-day I am prepared to report to you that I am doing the same but better work with one-half the kw. hours reported to you last year, and it is with a spirit of some amusement that I contemplate what efficiency I am attaining to-day, assuming always that upon the basis of 500 kw. hours per ton I was entitled to an efficiency of 83 per cent.

"Three problems have presented themselves for solution in the conduct of my work: 1, The power required to agglomerate and sufficiently heat for subsequent reduction; 2, the regulation of the size of the agglomerated particles, and, 3, the amount of reduction in the agglomerated material. The status of these three problems to-day is that a ton of ore is being agglomerated with an expenditure of about 250 kw. hours. The size of the product is under perfect control. The reduction is being made absolute. Inasmuch as the only function of the electric current is to agglomerate the dusty particles into coherent mass without binder or flux, and to convey a sufficient quantity of heat to the ore in the soaking pit to permit the reducing agents to perform their functions, it will be readily comprehended that the heat and current losses due to maintaining a molten mass are lacking."

In the discussion that followed the reading of Mr. Ruthenburg's paper, C. J. Reed of Philadelphia asked as to the utilization and disposition of the calories consumed in his electric furnace and soaking or reducing pit. This phase of the question was satisfactorily answered for Mr. Ruthenburg by Alfred H. Cowles, who said he had made a study of the heat efficiency of Mr. Ruthenburg's work.

Mr. Ruthenburg spoke of the practically complete elimination of sulphur in his furnace, and explained that he was convinced from careful observation that this was due to the reaction between FeS_2 and Fe_3O_4 at the high temperature of the electric furnace. Mr. Becker questioned the reaction, citing an experiment which he had made in which he attempted to make metallic iron by the reaction of iron sulphide and oxide, ending in failure. He also cited the unsuccessful attempts to obtain metallic nickel by the reaction of nickel oxide and sulphide.

Mr. Schell asked as to the purity of the product of Ruthenburg's furnace, and what became of the impurities. Mr. Ruthenburg explained that all impurities were primarily removed from the ore by magnetic concentration, so that practically pure iron oxide was what was supplied to the electric furnace. Therefore the sole duties of the electric furnace were, 1, to agglomerate the finely divided portions of ore into solid coherent particles that would not pack and impede the flow, and, 2, to impart so many heat units to the ore that reduction would be complete.

Mr. Ruthenburg also called attention to the fact that iron ore was unique in its property of being reduced by

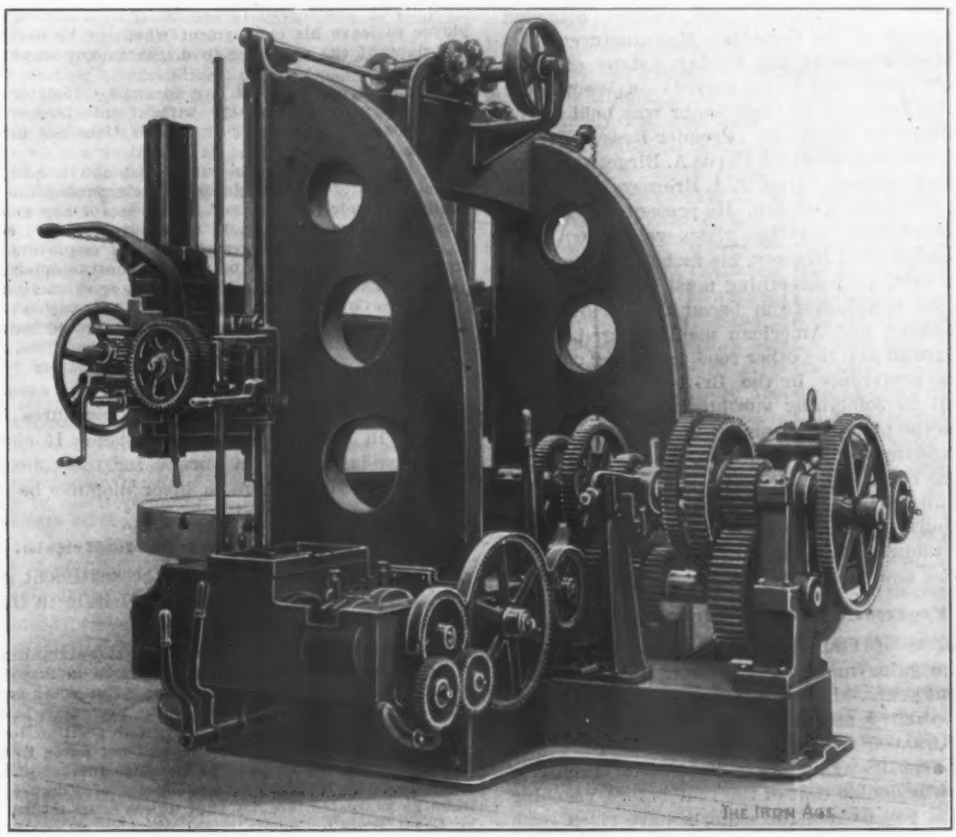


Fig. 2.—Rear View.

THE ROGERS BORING AND TURNING MILL.

CO at a temperature not very much greater than that of boiling water, although at higher temperatures short of melting the reduction is more rapid.

In closing the discussion Professor Richards said that at last year's meeting, in figuring the efficiency of the Ruthenburg furnace, based upon the figures given at that time, he had assumed that the ore was melted and that the work of the furnace was intended to prepare ores for the blast furnace. In the new light of the present paper he congratulated Mr. Ruthenburg on the success of his achievements, and thought there was great promise of electrically produced steel assuming an important place in the economic production of that metal in this country.

The Canadian Manufacturers' Association.

TORONTO, September 19, 1903.—A large number of delegates, chiefly from Ontario and Quebec, attended the annual meeting of the Canadian Manufacturers' Association, held on Thursday and Friday. Many of those from the other towns and cities arrived on Wednesday evening, when a reception in their honor was held at the Provincial Parliament Buildings. Premier Ross delivered an address of welcome, to which Cyrus A. Birge, president of the association, replied Hon. T. A. Brassey, M. P., London, England, also made a speech. He presented his views on the preferential trade question, views well known to be opposed to those of Lord Brassey, his father. It was generally felt, he said, that something must be done to prevent the United Kingdom from becoming the dumping ground for German and American manufactured goods. He believed Canada and the other food producing colonies should have a preference in the British market. But Canada should do something substantial in return. If it ever became the policy of Canada to exploit other markets at the expense of the manufacturers of the United Kingdom, there could, he said, be no basis for a preference. He admitted that this view and the view of the Canadian manufacturers seemed to be diametrically opposed, but he thought that mutual concessions would remove difficulties now in the way of agreement.

Progress of Manufacturing

In his address of Thursday evening President Birge referred to the gains made by Canadian trade and industry in recent years. Last fiscal year the total foreign trade of the country amounted to $467,000,000, an increase of $43,000,000 upon the trade of 1901-2. The people's bank deposits aggregate $460,000,000. Immigration last year was double that of the year before, reaching 125,000. In the last decade the exports have risen from $118,000,000 to $214,000,000. In 1893 Canadian manufactured products represented 39.8 per cent. of the total exports. In 1903 they were 47.2 per cent.

The Labor Question.

On the labor question the president spoke at some length, expressing himself with considerable earnestness, though not using aggressive language toward the unions. A few sentences suffice to indicate the tone of his remarks:

The workingman of Canada must never forfeit his right to sell his labor where he desires. The employer of Canada must correspondingly be free to purchase without interference such labor as he requires. The value of labor must be fixed by the capability of the seller. It is to be regretted that Canadian labor unions are so completely allied with and so largely under the control of central organizations, having their headquarters in the United States. Instances are not rare where, through this affiliation, Canadian industries have suffered to the advantage of the employers and workingmen of the United States.

In prosperous times, such as these, the unions in Canada may feel that they can afford to make unreasonable demands and adopt extreme measures, but the day may come, and may not be far distant, when a slump in the industries of the United States will reveal to them the fact that their best friends are the manufacturers of Canada. Why should it not be so?

The question was dealt with in two committee reports, which were received and acted upon after discussion by the association. A year ago a special committee was appointed to look into the labor situation. Its report is a review of the relations between the unions and the employers for some time back. It begins by referring to the question as the most serious confronting the manufacturers of Canada. It is admitted that there is a large legitimate field of usefulness for labor organizations, but the right of such bodies to coercively unionize factories, limit their output and dictate the number of apprentices is disputed. The report, which was approved, concluded with the recommendation that the following principles be adopted:

1. The Canadian Manufacturers' Association is not opposed to organized labor as such, but is unalterably opposed to illegal acts of interference with the personal liberty of employer or employee.

2. The Canadian Manufacturers' Association disapproves of strikes and lockouts, and favors an equitable adjustment of all differences between employers and employees by any amicable method which will preserve the rights of both parties.

3. No person should be refused employment in Canada or in any way discriminated against on account of membership or nonmembership in any labor organization, and there should be no interference with any employee who is not a member of a labor organization by members of such organization.

4. With due regard to contracts, it is the right of the employee to leave his employment whenever he desires, and it is the right of the employer to discharge any employee when he sees fit.

5. Employers must be free to employ their work people at wages mutually satisfactory without interference or dictation on the part of individuals or organizations not directly parties to such contracts.

6. Employers must be unmolested and unhampered in the management of their business, in determining the amount and quality of their product, and in the use of any methods or systems of factory management which are just and equitable.

7. In the interest of employees and employers of the country, no limitation should be placed upon the opportunity of any person to learn any trade to which he or she may be adapted.

8. The Canadian Manufacturers' Association believes that Canadian labor unions should be incorporated national organizations, governed by Canadian officials and free from foreign control.

The Parliamentary Committee of the association presented a report dealing with the measures before Parliament in the interests of unionism. It closed with a recommendation that a bureau for the collection of the experiences of members in labor disputes be established. The report was adopted.

No More Preference to Britain.

President Birge expressed the sentiment of the association toward the preference to Britain in the following terms:

I would not be just to Canadian manufacturers were I to withhold the fact that they have suffered in many branches of industry from the British preference. But what is the attitude of the Canadian manufacturer to the preference? We have always supported it. But we believe our position to be fair and reasonable when we say that we will not agree to any increase in the present preference. We might go further and confirm the opinion of the Honorable the Minister of Finance for Canada, when he suggested recently that unless some return were offered by Great Britain Canada might consider seriously whether the present preference would be continued.

The following message, signed by President Birge, was sent to Right Honorable Joseph Chamberlain, after the news of his resignation as Colonial Secretary was received:

The Canadian Manufacturers' Association, in convention assembled in Toronto, desires to express its deep regret that your withdrawal from the British Cabinet has been found necessary. This association has followed your proposals with the greatest solicitude, and hopes your efforts to adapt Great Britain's fiscal policy to existing conditions will continue to be vigorously enforced.

No Reciprocity With the United States.

The president maintained that not a vestige of sentiment in favor of reciprocity with the United States can now be found in Canada:

Our imports from the United States last year amounted to 57 per cent. of our total exports to all countries, and exceeded by $20,000,000 the combined exports of the products of our forests, our mines, our fisheries and our factories. We have 6,000,000 of people. They have 80,000,000. Our producing country might expect to supply, to some extent at least, their great consuming population. But no. Our farmers and manufacturers alike are barred. Why mention reciprocity? They have already an unfair advantage. Why increase it? Canada is in no condition to bargain with a neighbor which has a tariff wall twice as high as her own and a population nearly 15 times as large.

Canada was made the dumping ground for the surplus products of the United States. They sold their goods in this market from 10 to 40 per cent. lower than they do in their own country. It paid them to do it, but Canada should not allow it.

Protection.

A revision of the tariff is now necessary, in the opinion of the president, who felt he spoke for the association when he said that anything but protection would mean ruin to the manufacturing industries. Imports are now increasing more rapidly than exports, and already considerably exceed them. In some cases the raw material is sent to the United States to be manufactured. A higher duty on every item was not sought. In some cases a lower duty would be desirable, and much that had become obsolete in the construction of the tariff clauses should be swept away.

Tariff Recommendations.

The Tariff Committee made the following recommendations, which were adopted:

1. That we reaffirm the tariff resolution passed at the last annual meeting in Halifax, as follows:

"*Resolved*, That in the opinion of this association the changed conditions which now obtain in Canada demand the immediate and thorough revision of the tariff upon lines which will more effectually transfer to the workshops of our Dominion the manufacture of many of the goods which we now import from other countries.

"That in any such revision the interests of all sections of the community, whether of agriculture, mining, fishing or manufacturing, should be fully considered, with a view not only to the preservation but to the further development of all those great natural industries.

"That while such a tariff should primarily be framed for Canadian interests, it should nevertheless give a substantial preference to the mother country and also to any other part of the British Empire with which reciprocal preferential trade can be arranged, recognizing always that under any conditions the minimum tariff must afford adequate protection to all Canadian producers."

2. That, except in very special cases, we are opposed to the granting of bounties in Canada as a substitute for a policy of reasonable and permanent protection.

3. That we are strongly opposed to any reciprocity treaty with the United States affecting the manufacturing industries of Canada.

4. That we recommend the establishment in Canada of a permanent Tariff Commission of experts, who, under the direction of the Dominion Government, shall have constant supervision of tariff policy and changes, and shall follow closely the workings of the Canadian tariff, with a view to making such recommendations to the Government as will best conserve and advance the interests of the Dominion.

Other Resolutions.

Resolutions were passed asking the co-operation of the Government and the banks to put foreign silver coins out of the Canadian circulation; declaring that the minimum amount of British product in goods entitled to the British preference should be raised from its present proportion of 25 per cent. to 35 per cent. of the article's value; urging the appointment of three expert appraisers to supervise the operation of the tariff at the ports of entry; and calling for a Dominion insolvency act.

The officers elected were as follows:

President, Geo. C. Drummond, the Canada Iron Furnace Company, Montreal. First vice-president, W. K. George, the Standard Silver Company, Toronto; Ontario vice-president, H. Cockshutt, the Cockshutt Plow Company, Brantford; Quebec vice-president, Hon. J. D. Rolland, the Rolland Paper Company, Montreal; Nova Scotia vice-president, D. W. Robb, Robb Engineering Company, Amherst, N. S.; British Columbia vice-president, John Hendry, B. C. Mills Timber & Trading Company, Vancouver, B. C.; Manitoba vice-president, E. S. Drury, Winnipeg; New Brunswick vice-president, W. S. Fisher, Emerson & Fisher, St. John. Treasurer, G. W. Booth, Booth Copper Company, Toronto. Executive Council: J. O. Thorn, W. P. Grundy, J. P. Murray, R. J. Christie, Frederic Nichols, C. N. Candee, J. K. Osborne, W. Stone, A. W. Thomas, A. F. Rutter, A. S. Rogers, Thos. Roden, J. S. King, P. H. Burton, E. C. Boeckh, S. M. Wickett, W. B. Tindall, Geo. H. Hees, J. W. Cowan, R. A. Donald, H. Wright, W. B. Rogers. C. A. C. J.

The motor cycle is being developed rapidly as an economic and swift vehicle for public use. At the last exhibition held in this city the winner averaged 37½ miles an hour for four consecutive hours, and none of the machines was over 5 horse-power. One of them, rated at nearly 2 horse-power, was driven 19½ miles at a speed of 30 miles an hour upon a consumption of 1 pint of gasoline, costing about 3 cents, or at the rate of about 6 miles for 1 cent. All these performances occurred upon a level track, but there are plenty of places in this country where there are roads good enough to duplicate the records made. In so far as mere speed and economy are concerned the motor cycle is doing well, but much remains to be overcome to render riding them less arduous to those who man them. It is distressing to see a motor cycle rider whirling past at high speed with every muscle tense and his face drawn to resist the severe jolting and shaking he is compelled to endure.

Racing Yachts.

BY EGBERT P. WATSON.

A demonstrator in chemistry when dealing with solutions was accustomed to call the attention of his class to the results which would follow when one was mixed with another. Holding a graduate, he would pour certain fluids into a glass jar, but upon their union he would say: "You perceive, gentlemen, that this combination produces a beautiful blue color," but he was very careful not to announce the exact tint until the experiment was complete, for the reason that sometimes, from causes unknown, the color was not what he expected. This is apposite to designing world beating yachts, for, no matter how much experience a naval architect may have had, the performance of a vessel under sail cannot be predicted. This is not to say that, within certain limits, naval architecture is an inexact science, but it serves to show that between the lines laid down for a model and the performance of it under stress of wind and sea there is a wide margin of uncertainty, and it is safer to announce results after a race than before it.

While geometry will give the least dimension for a given displacement, there are several other things which it does not provide, and the much derided rule of thumb, or experience, as it should be called, must supply the deficiency. The lines of a boat are only one element of the problem to be solved; others are the sail plan, the positions of the spars and ballast, and the whole management of the vessel when under way. This last wins races against a handicap, and comprises the "know how to do it" at the bottom of every achievement. It is known to naval architects that the "Reliance" was expected to do certain things under certain winds, but she failed to perform them. She was a success so far as keeping the trophy in this country is concerned, but she did not come up to the expectations of her designer on technical points of sailing. This is true of "Shamrock III" also. In light winds, such as are prevalent on the course in August, she was intended to run away from her opponent; but exactly the reverse was the case, she was at her best under strong winds.

These citations show that the task of designing cup racers is not a simple one from any aspect, and that with all the experience and precedents which are at command, the margin of uncertainty is very large. Lucky flukes are by no means unusual, for by no other agency can we understand the advent of swift yachts of apparently impossible models from the molds of designers previously unknown to fame. Now that the racing machine has reached its limit, it is to be hoped that a return to swift vessels of a sea going type will be adopted in future contests for the cup. There are several tons of not very good junk in various parts of the world in the form of obsolete racing yachts, which is much more than there is need of. If, however, substantial boats in hulls and spars were built in competition, they could, in the event of defeat, be used for the transportation of the harmless, necessary clam at least, and serve an honorable career in that direction in lieu of perishing miserably in the melting pot.

Reports that a merger of the blast furnaces in the Mahoning and Shenango valleys was again under way, but had been declared off, are officially denied. This matter was up for consideration nearly two years ago, but nothing came of it and it has not been actively taken up since.

Lake Iron Ore Matters.

The Steel Corporation Laying Up Ships.

DULUTH, MINN., September 20, 1903.—Chief in interest of events of the week is the laying up of ships of the Steel Corporation on the lakes as the result of a strike in the Masters' Association, which has taken off mates as the ships have reached lower lake ports. About half the ships of the corporation are now laid by and are being stripped for the winter. It is announced that ore from corporation mines will cease moving by November 1. This is taken by many unacquainted with the facts as a sign of weakness. But an early closing has been expected by the trade since spring. The facts as to excess shipments last year have been well known, and were pointed out in this correspondence in December, 1902. In addition there was the diminution of consumption of domestic ores by reason of imports of foreign pig iron. The two facts made an excessive movement to lower lakes of not far from 5,000,000 tons. Strong efforts are being made by the Steel Corporation, and so far with apparent success, to keep their tow barges in commission. These represent a carrying capacity of 150,000 tons on a single trip.

All this year ore has been hurried forward. For while shipments up to September 1 showed a falling off, as compared with the season previous, of about 500,000 tons, this was fully accounted for by the later opening of this season as compared with that of 1902, which was a record year in its early beginning of navigation. Minnesota shipments to this date are much ahead of last year and are very active, the trains still running at a great rate from mines to docks. But, of course, with boats tying up every day this activity is on its last hours, and September will show a decline from last year, while the decline in October will be very heavy. The shipment of ore during November and December is usually costly and often precarious, on account of freezing in cars and dock pockets, &c. The weather is not to be depended on, delays are frequent, wages are often higher, disasters are more numerous, and it has been the policy of the United States Steel Corporation and other shippers to get their ore down early. That has been the policy this year, and it is doubtful if, strike or no strike, there would be any important tonnage forwarded later than November 1. The Pittsburgh Steamship Company have evidently decided that they may as well find out now as at any other time whether or not their agreements with unions can be depended upon, and will simply tie up ships and let things wait till another year.

The Mesaba Range.

Efforts have recently been made upon the Mesaba range to gather up a number of explorations of this year into one group and dispose of them all as one, depending on a considerable tonnage to make a favorable sale of each. With this end in view, Duluth parties have collected a number of explorations of the year, containing possibly 20,000,000 tons of ore of one kind and another, and are now in New York awaiting an opportunity of disposal. Some of these properties are not especially high grade. Another group, smaller but containing some better ore, is under negotiation in another direction. Aside from these lots of new ore few properties have been found the present year on the Mesaba by interests that can sell their discoveries.

The Republic Iron & Steel Company are putting into their Pettit mine, Mesaba range, a triple expansion pump that will care for all its water. The mine is making about 1800 gallons a minute. The same class of pump of similar capacity has just been installed at Shenango mine. The Republic company will mine this year from the Mesaba about 300,000 tons. Their Marquette properties, Cambria and Lillie, are not especially active, and may not be. Efforts to extend the ore bodies have not been as successful as was hoped, though at Lillie some new ore is opened into. Drilling and driving for ore are being carried on.

M. A. Hanna & Co., in the Consumers' Ore Company, have something less than 10,000,000 tons of Mesaba ore, all in State leases. Their largest single property, the northwest 40 acres in section 21-58-19, is now being opened and a shaft is in the ore. It contains about 3,500,000 tons. At the Leonard mine, near Hibbing, J. J. Hill interests have commenced shipments on a small scale. Not a stroke of work had been done on this property until February of the present year. Now a total of 160,000 cubic yards of overburden has been removed; shaft, drifts and raises have been driven and shipments have started. This mine is expected to be one of the large shippers among underground properties, and should win 500,000 tons the coming year. Recent explorations have increased the ore body to about 9,000,000 tons. The Great Northern road is pushing its tracks to the Forest mine, in section 13-57-22, and some ore will be sent forward as soon as the road is in, which may be early in October.

Other Ranges.

Contracts have been let for the exploration by diamond drill of old Quinnesec mine, Menominee range, and some mining is now under way there also. At Beta mine new boilers are being installed, and the work of exploration will be pushed.

Chicago & Northwestern Railway ore shipments from the Menominee range for the year to date have been 2,100,000 tons, about 500,000 tons under the corresponding date last year. The contest for ore traffic between this road and the Chicago, Milwaukee & St. Paul, and now of them both with the Wisconsin & Michigan, which has been referred to in this correspondence, as well as have the unique methods of moving ore to be adopted by the latter line, goes merrily on. The last named road is pushing its lines into the various sections of the Menominee and is surveying on toward the Gogebic. Now also it is running lines to all available water powers in the vicinity of its probable lines on the upper peninsula. It is constructing two great four-track ferries, in which trains of ore cars will be carried out of Pestigo, Green Bay, to Chicago and other ports of ore delivery. These ferries are to accommodate 60 loaded 50-ton cars on four tracks. The trains once run into the ships will be closed in by bulwarks, and the trains thoroughly blocked to stand stresses of weather.

The State Supreme Court of Michigan has affirmed the decision of the lower courts in the matter of the claim of the Cleveland Cliffs Iron Company to the lands of the Breitung estate, at Negaunee, which they proposed to mine under an old lease, giving free royalty for all ore smelted in the county. Two mines have been developed by the Breitungs on lands included in the suit. A good many men have been let out at Marquette range properties the past week or so. Winthrop has closed, its siliceous ore having no immediate use. Both the Oliver and Cleveland Cliffs companies have curtailed their forces at Ishpeming.

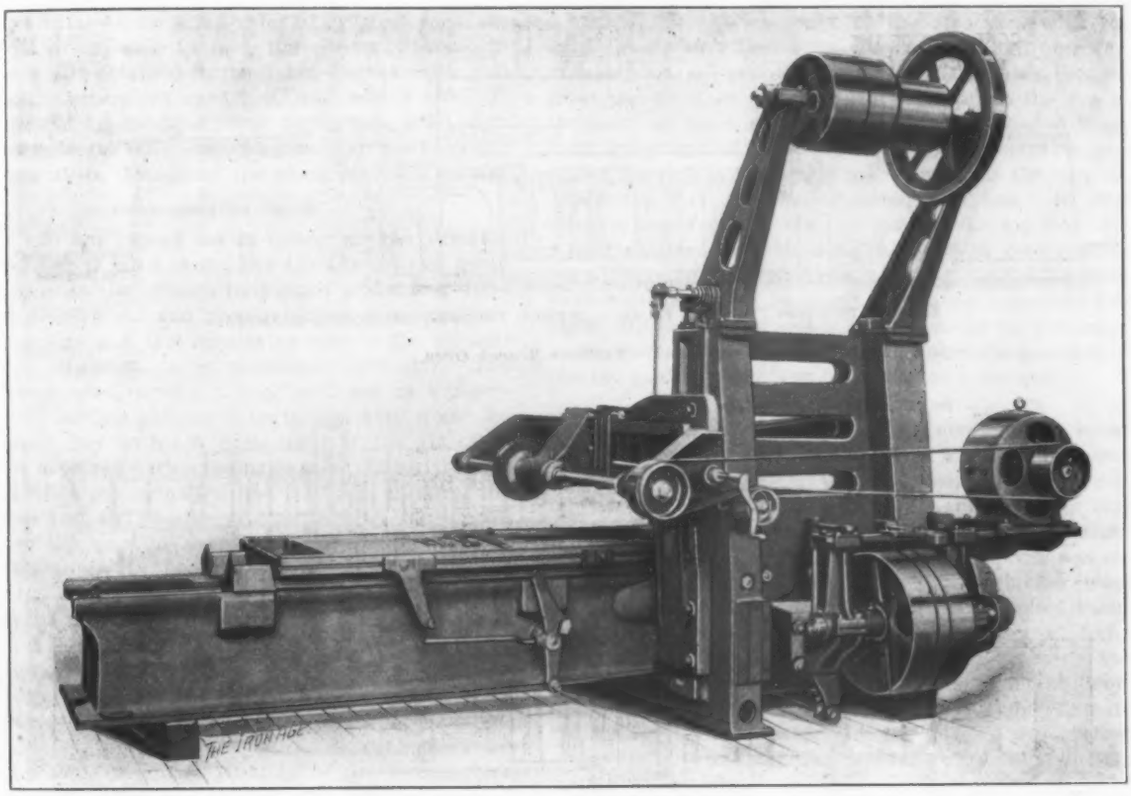
At Crystal Falls Mesaba range men have become interested in the Kimball property, and will explore it. This is in the town site, and there is reason to anticipate ore.

Final disposition has been made of the $1,000,000 plant of machinery at Arcadian copper mine, Houghton district. Great steel shaft houses and their machinery have gone to other mines in the district, and a quantity of other machinery has been shipped within a few days to the Cerro de Pasco Company, Peru. There is left at Arcadian just about enough machinery to carry on explorations, if such should be decided on. D. E. W.

Advantage of Undivided Responsibility.

Quite recently a serious accident occurred upon a trunk line railroad where the traffic is incessant, blocking the two main lines in such a manner that much switching was required to maintain any communication. The scene of the disaster was in the center of a populous city, and the people at large immediately flocked to the track in force. Wrecking engines were at once set to work, the loose parts gathered up, and the tracks cleared in a very short space of time. The comment on this incident is the manner in which the work was carried on. Notwithstanding the swarm of uninvited guests present, who were in more or less danger and constantly in the way, the railroad men did their work expeditious-

ly and without loud talk or profanity. All orders necessary were issued in an ordinary tone of voice and as quietly as if the incident was of frequent occurrence. In much less time than would seem to have been needed the tracks were cleared. The secret of this celerity and concert of action is a very open one—undivided responsibility. This was not always the case. It is not so many years ago when a smash up caused the greatest commotion among all the officials of a road, and every one who could by any possibility get there was on the spot, issuing orders and making confusion worse confounded by interferences in directions where they never had any experience to warrant such action. Now undivided responsibility soon brings order out of chaos, and the wreck master—who is a man of resource and skill—handles disasters of the kind alluded to without dictation from his superior officers.



THE DETRICK & HARVEY OPEN SIDE GRINDING MACHINE.

The Detrick & Harvey Open Side Grinding Machine.

The open side grinding machine here illustrated is an adaptation of the open side planer. It consists of the usual bed and reciprocating table, the well-known single post with its L-shaped beam housing and the triangular brace for same. In this case the usual tool carrying head is replaced with a grinding head mounted on a traversing saddle, which can be operated transversely of the table motion.

The wheel for grinding is mounted between clamps on a sleeve carried in the grinding head, and is operated by an electric motor at the back of the post through belting and a splined shaft in front of the beam, as shown. The transverse and vertical feeds are by hand through screws. A reciprocating motion is given the table at an equal speed in both directions. This motion is obtained from the countershaft, which is mounted on top of the post, and may be driven either from another motor or a line shaft. The table automatically reverses at any point, as in ordinary planer practice.

The capacity of the machine is to grind anywhere in a surface 50 inches wide by any reasonable length, according to the needs of the customer. The table drive is by a spiral pinion and rack and a pair of angular bevel gears and driving pulleys, as in the usual planer construction of the builders. This machine is adapted for grinding plates, frogs and switches, crossings and similar class of work. It is built by the Detrick & Harvey Machine Company, Baltimore, Md.

The Tidewater Steel Company's Year.

At the annual meeting of the Tidewater Steel Company, held on September 16, at Chester, Pa., President Charles E. Stafford reported the gross business for the year over $2,000,000. The production of the open hearth steel furnaces increased about 58 per cent., the 112-inch plate mill about 38 per cent. and the 72-inch plate mill over 60 per cent. over the previous year. The blooming mill is in active operation, and the company are now able to roll slabs for both their mills, and have a surplus of billets and slabs for the outside market. It is expected that the new coke ovens will be ready for operation about the first of the year, which will result in a greatly reduced cost of coal and coke.

During the year $134,000 was expended for the maintenance of the plant in addition to expenses for general improvement. The gross profit was $162,000, from which salaries, interest, dividends, &c., were to be deducted. There was credited to profit and loss for the year $36,500, which made the total surplus $93,537.

The balance sheet as at June 30 shows: Assets—Real estate and equipment, $2,012,467; tools and implements, $115,600; cash, accounts receivable, inventory and deferred assets, $659,824; total, $2,787,891. Liabilities—Common stock, $1,500,000; preferred stock, $591,500; maintenance and reserve fund, $14,086; loans and accounts payable, $573,089; insurance, pay rolls accrued, advanced rentals, unclaimed wages, &c., $15,080; profit and loss, $93,537; total, $2,787,891.

The following directors were elected: Evans R. Dick, George S. Graham, George McCall, Charles A. Porter, Russell W. Davenport, Charles T. Schoen, A. S. L. Shields, C. E. Stafford and F. W. Wood.

The Nernst Lamp Company of Pittsburgh have established an agency for the sale of Nernst lamps and supplies with the W. G. Nagel Company, Toledo, Ohio, this company having for several years acted as selling agents for the Westinghouse Electric & Mfg. Company.

By-Product Coke Oven Practice.*

The Regulation of the Combustion and Distribution of the Temperature.

BY D. A. LOUIS, F.I.C.

There is probably no one who would assert that all kinds of coal should be coked at the same temperature, or that a uniform temperature is desirable throughout the whole of the coking operation, although nobody would contest the fact that the temperature should be distributed appropriately but uniformly, whether it be a higher or a lower degree of heat. Hence it is that the regulation and distribution of the temperature in coke ovens have always offered attractive fields to inventors and improvers, and by the middle of last century a whole host of workers had suggested one thing or another to attain the desired end, including burning the washed or unwashed gases in flues around the coking chamber. However, it was Carvès who combined many of these disconnected notions. He investigated the matter sedulously, and found that with the coal he had to deal with—a poor noncaking coal—a high temperature rapidly and evenly distributed throughout the coal in conjunction with closed carbonizing chambers were the conditions for obtaining good coke, and at the same time a good yield of ammonia and tar rich in aromatic substances. It was he who improved the arrangement of the horizontal side flues in which the washed gases were burnt to heat the coking chamber; he, too, who insisted on the narrow chamber to insure the desirable rapidity of carbonization. In the early form the residual gases returned to the ovens were burnt over a solid fuel fire in a grate built for the purpose in the lower part of the walls separating the coking chambers. The heated and burning gases then circulated in two side flues, ascended to the uppermost of the three horizontal flues in the wall, and thence descended these in succession on their way to an inclined flue, which connected the lowest horizontal flue to the subterranean waste main leading to the chimney. In this scheme the highest temperature was developed under the ovens, and thence decreased in intensity in the order stated, and all the regulation of the

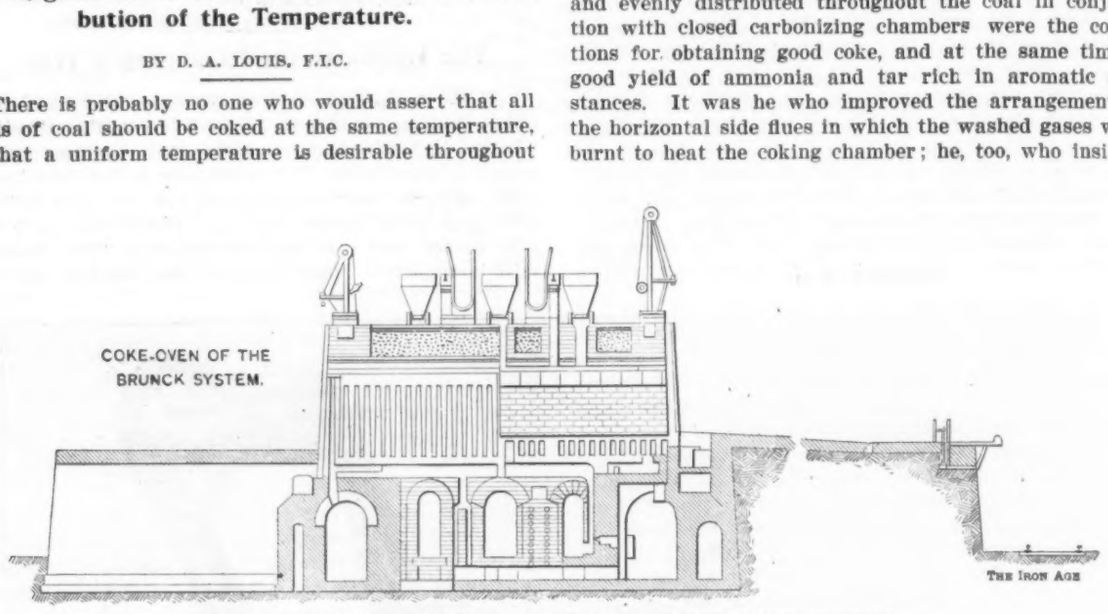


Fig. 1.—Sections Brunck Oven.

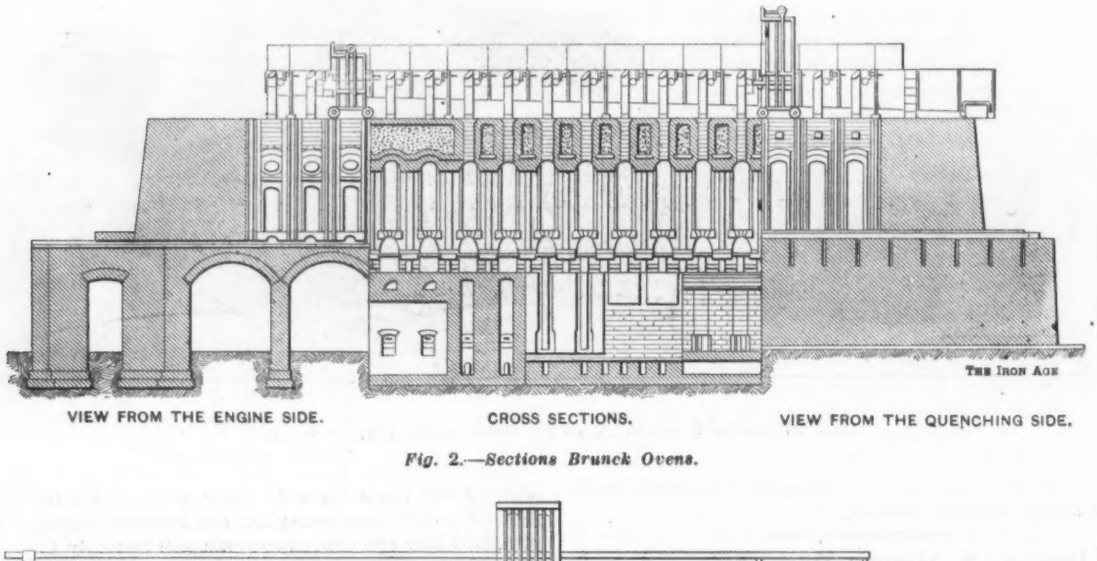


Fig. 2.—Sections Brunck Ovens.

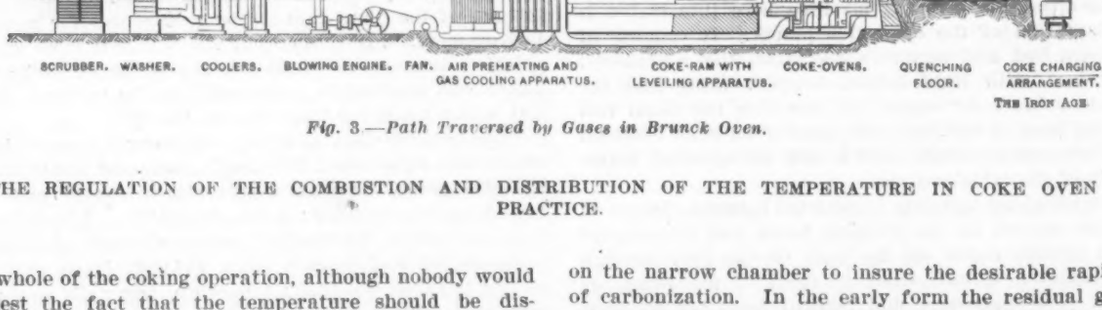


Fig. 3.—Path Traversed by Gases in Brunck Oven.

THE REGULATION OF THE COMBUSTION AND DISTRIBUTION OF THE TEMPERATURE IN COKE OVEN PRACTICE.

* Paper read at the September (1903) meeting of the Iron and Steel Institute.

combustion and the temperature took place at the grate. Later on the grate was abolished, the heat for the coking being derived wholly from the combustion of the gases, air being admitted under pressure to support the combustion, and therefore by controlling this air supply the combustion and the temperature could to some extent be regulated. Then came the notion that it would be better to supply hot air, and Simon introduced his arrangement in which, by allowing the air for combustion on its way to the ovens to pass through passages running between the underground waste gas mains, the heat from these gases passed to the air, which became intensely heated, and as a result the sole of the coke oven also became so hot that to avoid inconvenience from burning out the two flues of Carvès were replaced by a single flue, made of the most refractory material, so as to stand the heat; the gases then followed the same order of progress as in the old Carvès ovens, and, in fact, the effects produced in those ovens also obtained in the Simon-Carvès ovens, but in a greatly intensified condition, and would certainly meet with the approval of those authorities who advocate heating in the order indicated and maintaining the same temperature throughout the whole period of coking.

Semet-Solvay Oven.

Time will not permit me to follow all the variants of the horizontal flued oven; but anyway a good many people concur in the opinion that much preheating without good distribution and proper control is a questionable advantage, and this applies as well to the vertical flued type of oven, to be mentioned presently. The Semet-Solvay oven, however, may be taken as a representative of another pattern of horizontal flued oven. In these ovens only so much preheating of the air takes place as is acquired during the passage of the air through cooling flues in the structure, and both regulation of the combustion and distribution of the heat are considered. That is to say, part of the gas and the heated air for combustion enter the uppermost horizontal flue in the front of the ovens; more gas is admitted from the back of the ovens into the middle horizontal flue, while still more gas is admitted into the lowest flue from the front, hence giving a moderately good distribution of the combustible, the supply of which, of course, can be regulated; but some might disapprove of the partial allotment of the supporter of combustion. But to effect the better and more rapid distribution of the temperature each coking chamber is provided with its own sets of flues on each side. In many other ovens—vertical flued as well as horizontal—one set of flues is common to two coking chambers, consequently at whatever temperature the one is the other must also be, at least on one side; this is not necessarily the case with the Semet-Solvay.

Fabry-Linard System.

In the Fabry-Linard system, a more recent development of the horizontal flued oven, this feature of isolation is absent; but a decided advance is shown in the distribution and regulation of the combustion and in the localizing of temperature. The air again is only preheated by passing through simple cooling passages in the structure; but it is admitted into the uppermost and into the lowest of the three horizontal flues at each end of the ovens, the gas being admitted into the uppermost also at each end of the ovens. The supplies of both the combustible and the supporter of combustion are under control by valves, so it should be possible to regulate the combustion nicely. Now to localize the temperature a divisional wall separates the flues of one end of the ovens from the flues of the other end, so that the zigzag downward circulation of each supply of gas and air is restricted to one-half of the wall, hence the temperature of each half can be regulated independently of the other. But, judging from drawings, the main combustion is liable to take place at the top of the ovens, a position not always regarded as the most desirable, and from the same source of information it would appear that the distribution of the hot gases beneath the oven is not all that could be desired.

Coppee Oven.

Coppée followed Carvès, but, as a pioneer, developed the vertical flued oven, and it will be remembered that each chamber had its row of flues, which connected with the interior by apertures on one side at the spring of the arch of the chamber, while beneath each chamber and running the whole length and width of it there was a large arched flue connected at the discharge end with a main flue by a small vertical duct that could be closed at will; while at the other end, the chambers being worked in pairs, these flues were connected, also in pairs, by a short horizontal flue, so that by closing the outlet to the main in one of these flues the volatile products from one chamber had to pass through the connecting flue and traverse the whole length of the second long flue to pass into the main. Then just above the vertical wall flues, and connecting with each of them by a small orifice, there was a small longitudinal passage running the whole length of each chamber, and near the center connected through the roof of the structure with the external air by means of a vertical duct and pipe furnished with a regulating damper. The gases escaped from the chamber and mingled with air at the top of the vertical flues, and while burning descended these flues, entering the basal flue in a flaring condition, and thence passing to the waste main direct, or through the connecting flue and the adjoining sole flue. In this scheme, therefore, all the gas and all the air were admitted at the top of the side flues, which was perhaps not a desirable feature. Then, however, the flaring gases were well subdivided by passing down the numerous side flues. Moreover, it is well to emphasize the early attempt at regulating the supply of air and also the coursing of the hot gas in coke ovens by means of a damper.

Otto-Hoffmann Oven.

Again time will not allow me to follow all the splendid developments of the vertical flued oven, but it is well to note that this type of oven also went through a stage of violent preheating, first of both air and gas, later only of the air, which practice still survives in the Otto-Hoffmann oven. This oven in the earlier forms was encumbered underneath with regenerating checker work chambers, which alternately conducted the heated waste gases away from, or the air supply to, the ovens. Later the regenerators were put under the ends of the ovens, and of course, there were regenerators at each end, and connection with them was made through the flue beneath the coking chambers, which for the purpose was divided transversely across at the middle. The early idea of things was to admit gas and then heated air at one end in the sole flue; combustion immediately ensued, and the burning gases followed up the vertical flues on one side into the upper flue, and then down the vertical flues on the other side of the central division along the other half of the sole flue to the regenerative chamber. In the next stage of development the regenerators were reduced considerably in size and placed underground in front of the ends of the ovens, leaving the arches under the ovens entirely unencumbered; moreover, the gas was supplied at the top as well as bottom, so distributing the area of combustion. But even this did not satisfy those concerned, and to obtain better distribution and control of the heat the Hoffmann element—the regenerator—was dispensed with, and the gases for combustion, instead of being admitted unburnt into the flues, were led by piping beneath the wall between each oven, and from Bunsen jets rising from the piping were burnt in orifices opening into the side horizontal bottom flue, and rose through the numerous vertical heating flues to the horizontal top flue, whence they descended a narrow vertical flue at the end leading to a flue under the bottom of the coking chamber, along which they swept, ultimately passing as waste gases through an opening controlled by a damper into the waste gas main. The present patterns are known as the Otto-Hilgenstock coke ovens. In these the use of the Bunsen burner is retained, so that there is a concentrated intense combustion at frequent intervals near the bottom of the ovens and a diminishing although high temperature, elsewhere, which is continued throughout the coking, a practice considered by some as not the best mode of treating all coals for coking. Anyway, the gas directly and the air indirectly are under control, which is a good point, but there are some carping critics who think the distribution of temperature is not as satisfactory as it

might be—that is, according to these authorities, the flues immediately over the Bunsens should get hotter than those more removed from the direct flame. But, however this may be, there is no doubt that the vertical flues do subdivide the flaming gases, causing a good distribution of the heat, whether it be regular, irregular, weak, or strong.

The author has followed the coking practice in many centers, but in none so keenly as last year in Westphalia, where a great many collieries, widely distributed over and those elaborated by Franz Brunck are the most prominent competitors in this field. Both these made a more or less modest display at the Düsseldorf Exhibition, where their more successful rival was represented by a more imposing and highly creditable exhibit.

Of the Otto structures it is not necessary to say any more, but of the other two something further may now be said, more especially as the author had the opportunity of seeing examples of one of them, von Bauer's, actually at work; unfortunately at no colliery visited

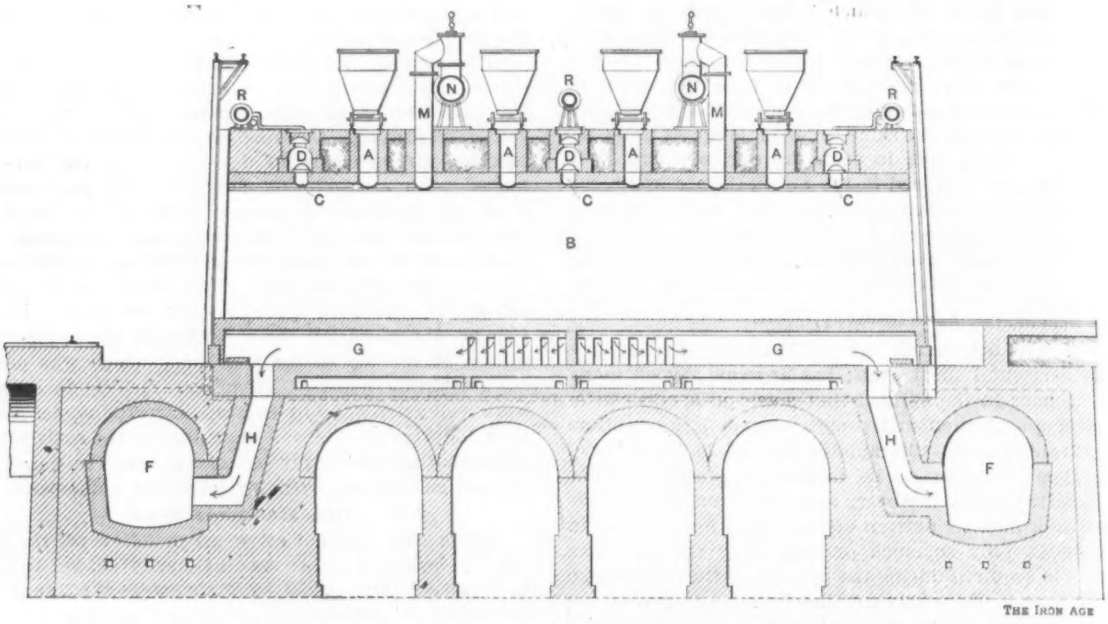


Fig 4.—Sectional View Von Bauer's Oven through Coking Chamber B.

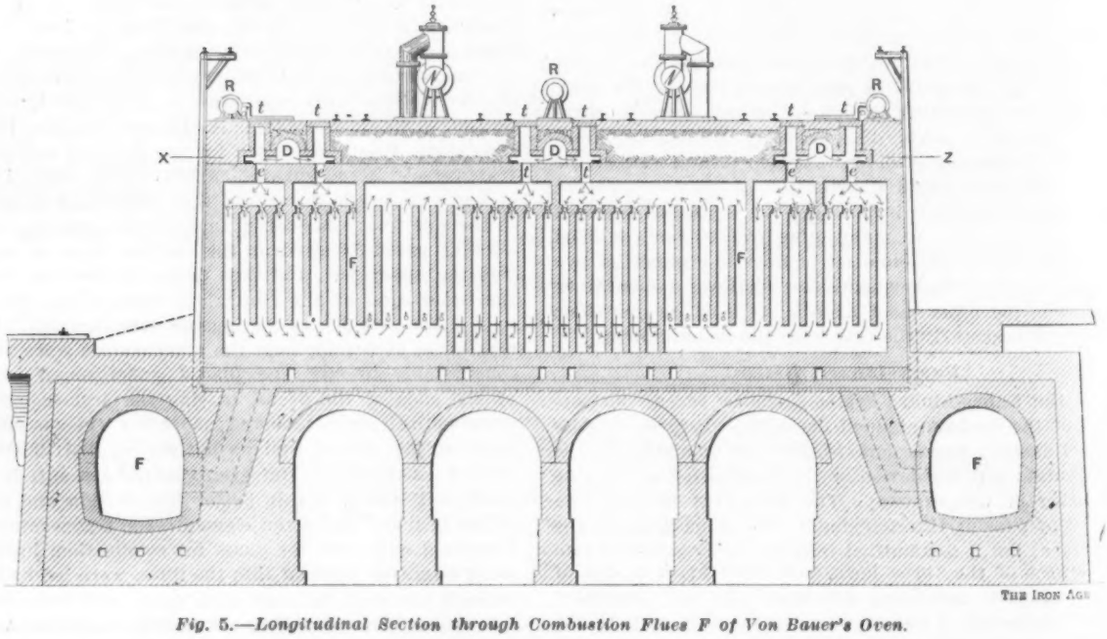


Fig. 5.—Longitudinal Section through Combustion Flues F of Von Bauer's Oven.

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the field, were visited, and at all the collieries visited vertical flued ovens were in use, and the particular models adopted were, in the preponderating number of cases, the Otto-Hoffmann, or the more recent form of Otto oven without the regenerating chambers, with or without by-product saving, and indeed they seemed to give satisfaction and maintain their popularity. But this popularity does not go unchallenged, for although the ovens contemporary with the Otto have not made headway in the competition, other ovens of new design enter into the lists and bid for public favor. At the present time the ovens due to the ingenuity of Dr. Theodor von Bauer were Brunck ovens in use, although there are a good many about.

Brunck Oven.

The Brunck ovens resemble other coke ovens in having long chambers supported on a substructure. The Brunck substructure is, however, one of some complexity, as it contains an elaborate series of connecting ducts, cooling channels, checker work chambers and vaulted conduits. These arrangements serve for the removal of the waste gases and for preheating the air supplied for combustion, as well as for conducting it to the points where it is required. Moreover, to insure a better distribution

of the heat the ovens are heated from each end independently, hence all the substructural arrangements are in duplicate. The coking chambers are built on the top of an upper row of cooling passages; arched chambers are first constructed, separated by good solid walls, and within these the coking chambers proper are built with a longitudinal flue below each chamber, while vertical flues arranged on each side of each chamber with a general longitudinal flue above connect wtih the lower longitudinal flue below. The lower flue is divided into four sections by parting walls, and a parting wall extending all round the outside of the coking chamber at the center completely shuts off one side of the surrounding space from the other, and separates the flues of one end from those of the other.

The firing of the ovens is effected by six gas jets, three at each end, of which one is set in the sole flue and one in each side, while the air forced along by a fan traverses various passages below, and is delivered by ducts and ports to the scene of action. The burning gases ascend the end flues and descend the flues at the center, passing into the waste mains, which run below along the center

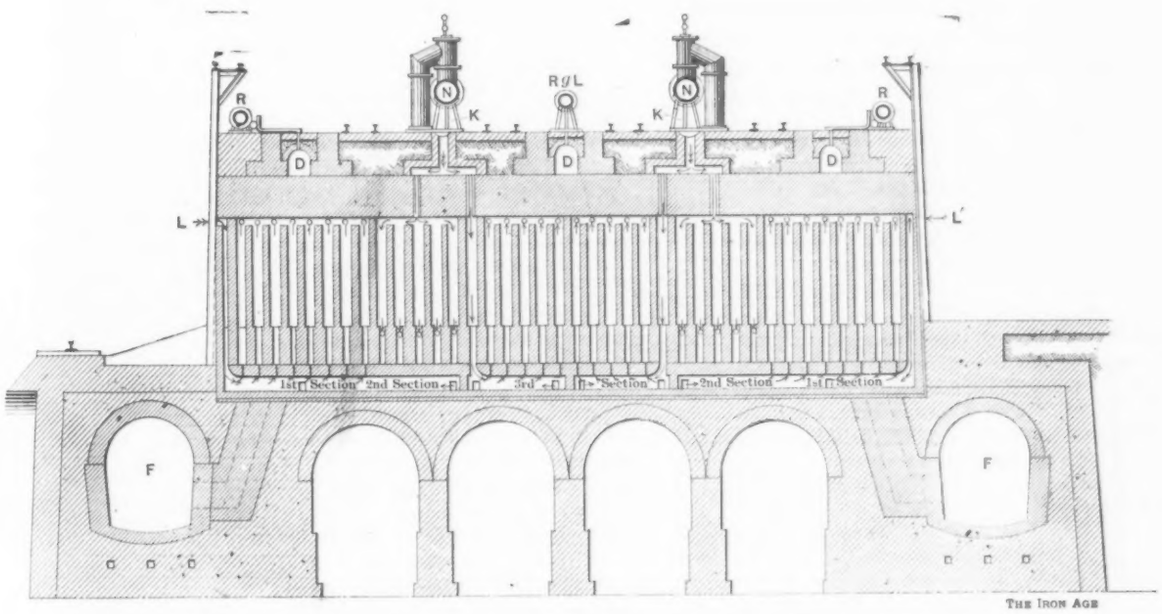

Fig. 6.—Longitudinal Section through Air Flues Von Bauer's Oven.

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and at right angles to the direction of the ovens. There are two of these mains, and between them is built the two sets of checker work, through which part of the air supply passes on its way to the combustion chamber and becomes highly heated. The rest of the air supply courses through a special conduit and through various cooling passages, taking up heat on the way. Furthermore, the air supply is used to cool the products of distillation, and so again takes back to the ovens some of the heat that would otherwise be wasted, and in addition economizes water required for cooling. Moreover, the exhaust steam from the engines and pumps of the condensing plant is used for preheating the gas before returning to the ovens to perform the function of a fuel. Associated with the Brunck ovens is a special by-product recovery plant. The Brunck system involves an excellent distribution of heat and also of centers of combustion. The Brunck oven is built 33 2-3 feet long, and 6 feet 6¾ inches to 7 feet 4¾ inches in hight, and from about 17 to 21 2-3 inches in width; having a capacity of from 5 to 7½ tons of coal containing from 10 to 15 per cent. of water. The ovens are calculated to burn from 26 to 34 hours, and to carbonize from 2000 to 2100 tons of coal per oven per year. The quantity of steam produced by the waste heat, assuming that the gas surplus is also used for the purpose, has been calculated by interested parties to be from 9-10 to 1¼ hundredweight per hundredweight of wet coal. But in spite of the favorable points noted, the Brunck system appears to restore features discarded by some authorities; for example, encumbering the substructure with manifold flues and chambers.

Figs. 1, 2, 3, Plate I, illustrate the design and character of the Brunck oven. Fig. 1 is a longitudinal section partly through the wall flues, partly through a coking chamber; beneath the latter may be seen the lower longitudinal flue with the openings into the side flues; beneath these the air admission flue is shown connecting by channels and ducts with vaults, cooling passages and checker work, and in the section through the oven the mode of carrying off the waste gases is shown. Filling trucks and openings, gas take off and hydraulic main, winch for lifting doors, &c., are also shown. Fig. 2 illustrates various cross sections and elevations, and the special features of the substructure are clearly set forth and may be followed, the character of the checker work and of the various other air passages and connections, and just at the center the waste gas ducts and connections are shown. Fig. 3 is a sketch of the path traversed by the gases in the Brunck system; the special feature, the cooling of the gases and the simultaneous preheating of the air, is depicted at about the center of the figure, and the mode of conveying the heated air to the ovens is indicated. Moreover, the apparatus for recovery of the by-products is suggested in the figure, and the pipe system for the return of the washed gases to the ovens is duly set forth.

Von Bauer Oven.

The von Bauer oven, of which the author saw the battery at work at one of the late Friedrich Krupp's collieries, "Hannover III," situated between Bochum and Gelsenkirchen in Westphalia, is another variant of the vertical flued horizontal oven, and besides some ordinary points of similarity resembles the Brunck oven in having the heating system of one end separated by a parting wall from the heating system at the other end, but here ends all similitude. The von Bauer oven has a simple vaulted substructure with a simple set of alternately wide and narrow longitudinal cooling channels separated by thick walls, but connected by transverse ducts. Upon these walls are built the walls of the coking chambers, which are constructed with three sets of vertical flues or passages, the outer ones serving for combustion chambers, the inner set for the air supply; under the coking chamber and over the wider cooling channels there is the usual

longitudinal vaulted combustion chamber, but divided transversely by a wall at the center, and it only connects with the group of side flues near the center, there being no connection between this bottom chamber and the three groups of flues nearer the ends. But this chamber is in direct communication with the waste gas main at either end. The air passages communicate with the combustion

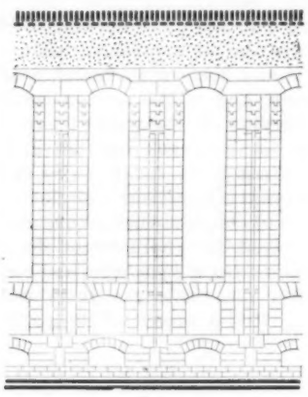

Fig. 7.

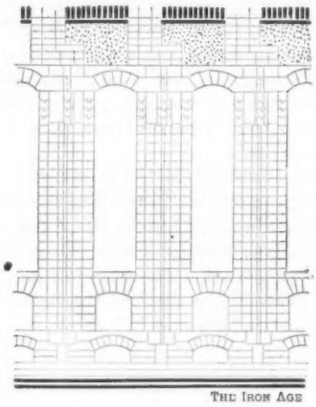

Fig. 8.

Sections Showing Flue Arrangement Von Bauer's Oven.

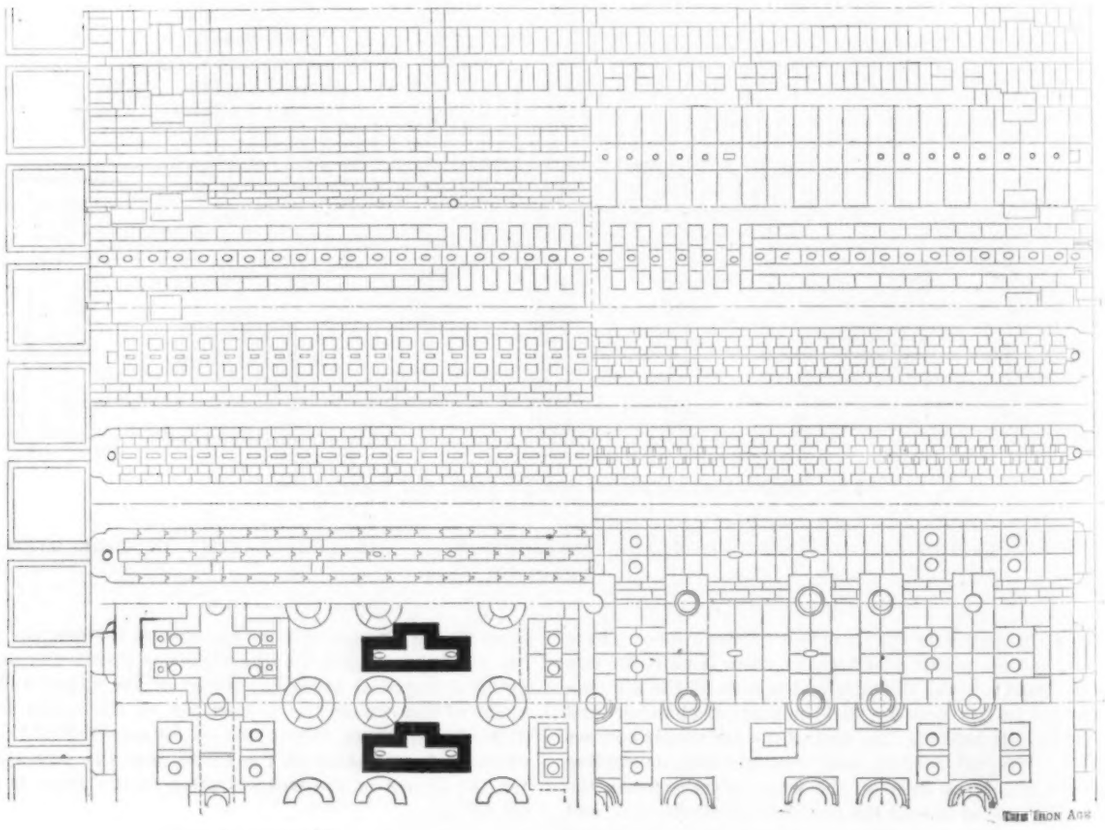

Fig. 9.—View Showing Relation Side Flues, Cooling Ducts and Air Supply.

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flues at prearranged spots by means of small orifices, so that air is admitted exactly where required. The combustion flues unite in an upper longitudinal flue, those at one end being separated from those at the other by a central wall, and, moreover, by means of intervening walls in this longitudinal flue they are subdivided into two groups, at each end, of four flues each, and one much greater central one of 11 flues. There is also a lower longitudinal flue, in which the first eight flues and the first five central flues unite, all the other flues being separated by walls from one another; and it is at these points that the six central flues on each side of the middle wall connect with the chamber under the coking oven. The air passages in the walls are also arranged so that the air from one side does not mingle with the air on the other side of a median wall; moreover, they are divided into groups, each group of flues receiving its own supply of fresh air, which is delivered at the desired spot to properly assist combustion; but before entering the combustion flues it traverses either the cooling channels below or, when entering from above, some length of air flue, and so becomes heated. Air is admitted either from the top or the ends, and leaves the ovens in an altered form by the waste main, but only after having done duty in the combustion flues.

Turning now to the upper part of the oven, it differs essentially from any the author has previously described in this paper. Firstly, there is no longitudinal flue over the top of the coking chamber, but instead there is a ma-

sonry roof pierced by nine openings; four of these spaced at equal intervals serve for charging the ovens if loose coal is used, the charging taking place through the end door if compressed coal is used. Two of these top openings serve for taking off the products of the coking when separation of by-products is desired. The remaining three are in connection each with a corresponding chamber; there are three of these, running at right angles to the direction of the coking chambers across the whole battery of ovens, one being at the middle, the other two near the ends. These chambers or conduits, where they pass over the combustion flues, connect with them by vertical ducts, there being a duct for each of the two end groups and for each of the six-flued central groups; moreover, by means of piping above, these upper chambers can be connected with the return gas from the by-product works. These upper chambers serve as a gas store and as a gas supply; in the latter capacity, the gas from the by-product works, or when no by-products are being saved the gas from the coking chambers, passes into them and through the ducts into the combustion flues, where it is burned along with the air to heat the coking chamber; passing down the first two groups of flues after mingling with the hot air at the top of them into the lower longitudinal flue, where it meets a further supply of air at the bottom of the next group of flues, up which it passes into the upper longitudinal flue, where it encounters a fresh supply of gas from the duct leading from the central gas conduit, and another supply of air at the top of the last group of flues, down which it goes into the big flue under the coking chamber and thence into the waste main. A special feature is that all the openings, either in the oven itself, or in the gas chamber, or in the side flues, or in the air inlets, are easily accessible and under control; there are covers to each kept in recesses at the place where they are required, and as these are easily manipulated from openings in the roof, either the air or gas supply can be regulated to a nicety at any spot desired. It was very interesting to see how easily this was done, and how soon any movement of the covers was responded to by a local variation in temperature. It is by this means that the temperature of these ovens can be regulated to conform with the stages of progress of the coking operation, which is regarded by many as a highly desirable factor in coke making. It is by this means, too, that the ovens may be run either with or without saving by-products during the one operation. If it is thought desirable to save by-products at any stage from any oven it is only necessary to uncover the openings leading to the by-product hydraulic main and system and to close the openings connected with the gas conduit, and if later on it is thought desirable to cease passing gas through the by-product works any particular oven is easily disconnected by reversing the operations just detailed. Of course, the ovens can be worked either wholly without saving products or wholly with the recovery of these materials.

All the ovens are in connection with the gas conduit above, so all are under the same pressure; nevertheless any one can be isolated at will by simply covering the controlling openings without disturbing any of the others in the battery. If more gas is being made than is consumed it accumulates in the gas conduits, and is advantageous in providing an atmosphere full of hydrocarbon in those chambers where the operation is coming to an end and where gas is ceasing to be evolved. Where consequently the desirable pressure is not maintained, the gas from the gas conduits enters to equalize the pressure, and under the circumstances the hydrocarbons are decomposed, depositing carbon in the way known to all who knew anything about coking. Besides the openings already mentioned in the roof there are others for admitting air into the inner groups of air passages, which, as we have already remarked, are controlled by movable covers. The roof is, of course, provided on the top with tram lines, four sets in this case, for running the charging wagons on; there are also the other usual accessories.

Von Bauer's oven is made from 26 to 39 feet long, the latter by preference, 7 feet in hight to the top of the vault and in width 21½ inches at one end, tapering to 19½ inches at the other end. The capacity of each is 10 tons of loose coal or 12½ tons of compressed coal.

Fig. 4 is a sectional view of von Bauer's oven through the coking chamber B; A is the charging opening; C the ducts to the gas conduits; M the connections for use when products are saved; R are the washed gas mains; G the divided lower longitudinal flue, showing connections with the side flues and the waste passage H and tunnel F. The vaulted substructure and the cooling passage may also been seen. Fig. 5 is a longitudinal section through the combustion flues F, and shows their relation to one another, the various air orifices and the connections with the gas conduits, and with the openings in the roof above.

Fig. 6 is a longitudinal section through the air flues, and sets forth the various points connected with them, incidentally illustrating other matters, such as the character of the covering of the whole structure and the mode of charging the returned washed gas into the gas conduits. Fig. 7 is a cross section showing the arrangement of flues, passages and chambers. Fig. 8, a similar section showing relation of side flues to the bottom flue, and of the air passages to the air inlets in the roof. Fig. 9 shows the relation of the side flues to one another, and of the transverse cooling ducts to the air supply. In these ovens it will be observed that the regulation and distribution of the combustion and the temperature are elaborated to a nicety. What is more, the arrangements worked well at Hannover III. colliery, where it was particularly interesting, inasmuch as there were also a number of Otto ovens coking the same coal at this colliery. This gave an opportunity of making a comparison, and as far as that coal was concerned the von Bauer oven acquitted itself with distinction. The 50 Otto ovens, according to the foreman, were producing 130 tons of coke in the 24 hours, giving a yield of 69 to 70 per cent. of the coal; the 34 von Bauer ovens were producing 170 tons of coke in 24 hours with a yield of 73 to 74 per cent. of the coal; moreover, the von Bauer was a denser coke. In both cases the gas and heat not consumed in the ovens were being used under boilers, and the von Bauer was again showing to advantage. This would seem to show, what would be anticipated, that there really is some virtue in having the gas and air supply well under control and well distributed in the firing flues, for these were the most striking features in these ovens, coupled with localizing and distributing the temperature, for these, like the Semet-Solvay ovens, have two complete sets of flues to each oven.

Acid Proof Castings.

BY DR. OSKAR NAGEL, NEW YORK.

During my work in different chemical industries I have observed that pig iron corresponding to the following analyses, and mixed in the proportions stated, is exceedingly durable regarding the action of acids:

	A. Dark gray.	B. Light gray.	C. Mixed.*
Silicon	3.5	1.5	0.7
Manganese	0.5	0.4	0.2 to 0.3
Phosphorus	0.2	0.2	0.2
Total carbon	3.8	3.5	3.5

* Mixture of dark gray and light gray.

All three qualities should be free from sulphur and copper. To get the best result, A, B and C should be mixed in the proportion 2:1:1.

The electric roads of the United States carried last year three times the population of the earth. They ran their cars 11 times the distance from the earth to the sun. They killed 1218 persons and injured 47,429. Their capital was more than twice as great as the bonded debt of the United States, and their gross earnings for a year were nearly a quarter of a billion dollars. They paid over $13,000,000 in taxes. They employed more than twice the number of men in the United States Army, including the forces in the Philippines.

Schumacher & Boye of Cincinnati, Ohio, are sending to the trade a useful reminder of the fact that they build engine lathes, in the form of a very neat celluloid letter opener.

The Iron Age

New York, Thursday, September 24, 1903.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

As Others See Us.

Concerning industrial commissions which come to this country to inquire into our methods of manufacture, a few words may be said. If they come with minds open to conviction they may or may not profit by it, but if the members of such commissions belong to the class who "having eyes see not," or "being convinced against their will are of the same opinion still," they have spent time and money to no purpose. President Luig of the Düsseldorf Exposition, in an address to the various trade organizations in that city, recommended them to visit this country "because something could be learned wherever one looked," but George Barnes, secretary of the British Amalgamated Society of Engineers, who visited this country last year, is of a contrary opinion, if his article in a recent issue of *Cassier's Magazine* is any criterion. He finds much to praise in our patent laws and public school systems, but in other respects—social aspects, sky scrapers, elevated railways, and "shoddy work" in our shops—he finds much to condemn. The American system, he says, tends to produce "men of stunted growth and narrow views." Moreover, our goods are of inferior finish and of bad quality both in material and design. We specialize and systematize too much, and we have too many persons of "foreign extraction" (whatever that may mean in this connection) in our shops. Everywhere he went he found such persons acting as foremen and chief mechanics.

Mr. Barnes assumes, for want of any positive information in the premises, that these persons of foreign extraction were carrying on American works through methods learned in their native countries—that is to say, "remote, unfriended and melancholy slow" methods; but if he had improved the opportunities given him he would have found that the foreigners were working under American plans and systems, with American brains to direct their labors. Surely a man of Mr. Barnes' intelligence does not wish us to believe that imported "persons of foreign extraction" can improve upon our own ways. If they could, the countries which have had the honor of being their native places would not be toiling in the rear in the strife for supremacy.

Our locomotives are worse than all the other odious features of American life. "Instead of," says Mr. Barnes, "the trim, clean and nicely painted engines of the Midland or other of the English main roads, he will find a great lumbering monster, with leaky joints and asthmatic wheeziness, rough black paint and dirt begrimed." This is certainly shocking, or would be if it were correct, but, unfortunately for Mr. Barnes' credit as a historian and observer, it is not a true indictment and therefore needs no defense.

The most serious accusation brought against us, however, is that our democracy is spurious and "denotes no real social equality." It is admitted that there is a certain "free and easy conversational style between bosses and workmen, but it means nothing, and workmen are really more embittered toward their employers than they are in England." We are moved to say that Mr. Barnes seems to extenuate, or else he is not so close an observer as Charles Dickens and Charles Reade, novelists of his own country, who wrote accounts of trade doings in England that startled the civilized world everywhere. Prophets are not without honor, save in their own country, saith the adage, and we must so far honor Mr. Barnes as to credit him with good intentions in his brief remarks upon the shortcomings of Americans, but we fear we cannot take them much to heart, for they are merely a repetition of what other British observers have found objectionable. We have in times past been cautioned against going too fast, against making too much progress, and being ahead of other countries in trade generally, but we seem to be "stamped with the seal of racial as well as economic inferiority" (to use Mr. Barnes' words), so saturated with it that it is wonderful that we are able to do business at all.

Is it not rather anomalous that so many of our foreign competitors come over to see how we are getting along, and find, upon what they consider to be investigation, that we are really "in a neurotic and unhealthy condition," quite an inferior order of persons, in fact? Is it not a little singular that they should endeavor to put up commercial fences against us, and try to shut us out of the markets of the world wherever it is possible to do so? We think it is, and if we may make a suggestion to future investigators, it would be to adopt all of our methods as far as they can, or are able to comprehend them, and skip the social and political aspects of this country as incomprehensible from their point of view.

German Industrial Syndicate Experience.

The practical operation of the German industrial syndicates has lately been the subject of critical investigation by British consuls, with the result that the British Foreign Office has gathered a good deal of interesting literature concerning them. As the facts thus accumulated have much interest for American readers, they may be digested with profit.

During the past few years the whole economic life of the German Empire has been affected by the tendency toward combination. Trusts and mergers are practically unknown, but syndicates and what are known as cartels, which would here be designated pools, now control nearly every department of production and distribution. The syndicate would seem to correspond very closely to what is here known as a "voting trust." It separates production from distribution, does away with all direct relations between producer and consumer, and from a central office regulates the conditions of sale for a whole branch of manufacture. In these respects the syndicate somewhat resembles the ancient guild, the idea having been modernized to fit present century conditions. Its underlying idea is economy in production and distribution. From this it was but a short step, in view of the multiplication of factories and the steady increase of production through the employment of improved machinery, to efforts to restrict production and maintain prices. The next step would naturally be a movement to advance prices by the creation of an artificial scarcity, and this is the stage of development which the German syndicates seem to have reached.

During the recent period of general business activity in Germany the syndicates were successful in running prices to a very high average level, but so great was the consumptive demand and so eager were purchasers to obtain goods that no complaint was heard. No doubt this policy has considerably accentuated the subsequent depression, since it called into existence a large number

of independent producing concerns, which would not have been started if the inducement of high prices had not been offered. However, the syndicates have disappointed prophecy in managing somehow to survive depression. This is due in some degree, no doubt, to the fact that they have adopted and maintained a policy which, in the circumstances, would seem to be extremely hazardous, but which undoubtedly makes for high prices. They have granted private export bounties to assist in getting rid of stocks which would have been troublesome at home, and in this way have prevented dangerous accumulations in first hands. Little or no profit was made on products exported, but the lack of them has been compensated for by the prices charged the domestic consumer. On this subject the British Consul-General at Frankfort, Mr. Oppenheim, gives in a recent report the following interesting particulars:

The export bonus system was introduced in 1897, and bonuses were granted by the coal, raw iron and half-finished goods syndicates, with partial co-operation on the part of the coke syndicate. The rate, which was fixed at 15 marks per ton net of the exported goods, was, however, only granted upon a proportion of the quantities (two-thirds, one-half or even one-third) of the raw material got from the syndicates. In principle, the bonus was only to be paid to unions which offered a guarantee that by these premiums the foreign market price would not be lowered below the limit established by foreign competition. The commercial boom, however, diminished the importance of these bonuses, because the prices on the foreign market rose in 1898-99 partially above the inland selling price. With the turning tide new efforts were made to establish the export bonuses on a firmer and more lasting basis, more especially on account of the home contracts extending over long periods, mentioned above, by which raw material was delivered at high prices, although prices for manufactured goods were low. In these circumstances the foreign market alone was left to manufacturers to rid themselves of the accumulating stock. The consequent export, more especially of iron goods, therefore swelled the demands for export premiums, and recently an arrangement has been made by various Westphalian syndicates by which there is established at Düsseldorf a central office under the style of Clearing House for Exports. This office is empowered to settle the amounts of the export premiums or bonuses by the syndicates and their members, and all accounts and calculations are settled, and the respective payments of bonuses are effected there. The amount of the latter is to be fixed quarterly. Thus for the second quarter of this year it was granted at the following rates: 1 mark 50 pfennigs per ton of such coal and coke as is used for the manufacture of export goods, coal being calculated to yield 70 per cent. of coke; 2 marks 50 pfennigs for the ton of raw iron, exclusive of the bonus upon coal; furthermore, 10 marks per ton half-finished goods, and 10 marks per ton girders, both inclusive of the bonus granted on coal and raw iron. The export premium must as a rule not exceed the difference between foreign and inland prices; the central office further retains 1 per cent. of the premiums to cover working expenses.

There would appear to be great danger in this system of disturbing the relations of Germany with other nations, and inducing the enactment of countervailing duties to offset the export bounty. It is true this is not paid by the Government, but the result is the same as if it were, and it would require no great ingenuity of argument at some capitals to make it appear that the syndicate export bounty was really a Government subvention in disguise.

As might be expected, the conspicuous disadvantage at which the home consumer is placed by the sale of German products abroad at prices materially lower than those at which his own requirements are met has caused great complaint at home. This policy is defended by the syndicates on the ground that they do not sell abroad more cheaply than at home because they want to, but that if they did not their whole trade would be ruined. Their surplus could not be exported at home market prices; production would be sharply curtailed by accumulations; many manufacturers would be driven out of business and the ultimate result would be to place the domestic consumer at a still greater disadvantage, since competition in supplying his wants would be sharply restricted. That the speciousness of this argument is evident to the domestic consumer may safely be assumed, but perhaps he is not ready to demand that so heavy a blow be inflicted upon German industry as would be involved in securing Governmental interference with the existing system. It is perfectly understood, however, that the German syndicates have not only met existing foreign prices, but have lowered them materially in many cases by their eagerness to unload their accumulated stocks. The British consular inquiries have brought to light what is probably the most conspicuous example of export sales at prices far below net cost in order to sustain home prices. This is in the case of the German wire tack syndicate, whose operations show losses aggregating 895,000 marks on exports for six months, and net profits of 1,200,000 marks on domestic sales. The import duty establishes the price of these goods in the home market.

Most of the syndicates have adopted measures which customers are finding oppressive. If a consumer, who has opportunity to do so profitably, buys abroad and thus deprives the domestic producers of what they are coming to regard as their own, he is at once a marked man. When he needs anything made at home he finds himself the victim of a quiet but extremely effective boycott. To buy anything is almost impossible, and to sell what he makes he must look for business where the boycott of the syndicate which has blacklisted him is not effective. He is even likely to find that a number of syndicates are combined to ruin him. Thus, the wire rod syndicate will not supply stock to any manufacturer of wire tacks who is not a member of and obedient to the wire tack syndicate, and the members of some other syndicates will not buy from one who has been blacklisted by that from which he should draw his supplies of raw material. It would appear from this that the syndicates pull together and help one another. So they do in certain small matters, but in larger matters they compete sharply and do one another all the harm possible. This is to be expected. On this subject a recent consular report says:

The best customers of the manufacturers of half-finished goods are, of course, those manufacturers for whom half-finished goods constitute the raw material. They must pay for the half-finished goods the prices fixed for the home market, while the same syndicates either sell the same half-finished goods to customers abroad at greatly reduced prices or allow their members to sell abroad at whatever prices they like. For example, the export of machines benefits national labor more than the export of iron bars; yet iron bars, while they cost home customers 95 marks delivered at the Rhenish-Westphalian works, were exported during the month of September for 80 marks, or even 72 marks, free on board. It is said that the British and Belgian rolling mills calculated their prices for rolled wire upon the basis of these cheap purchases in Germany, so that the price fell very considerably in the foreign market, and the German wire industries, which export nearly 60 per cent. of their produce, were forced to make allowance for this considerably reduced price. A very glaring case in point was reported in Düsseldorf. A factory using tin for its raw material maintained for many years a profitable trade with Holland in tin goods, in consequence of the cheap export price of tin. The identical goods are now manufactured in Amsterdam, very probably from German material, so that the manufacturer was left with a stock of about 100,000 pails, for which he could find no customers. Another firm has decided to transfer a considerable part of its establishment to Holland, as it can there obtain the necessary German raw material so much more cheaply than in Germany.

This is certainly an anomalous condition of affairs, but it is easy to see how, when every stage of manufacture, as well as every trade, has its own syndicate, pulling and hauling to gain the largest possible advantage for its members at the expense of every other syndicate, and especially of the consumer, just such complications as those described might arise. There is now a movement on the part of consumers of partly manufactured materials to free themselves from the control of syndicates representing earlier stages of manufacture. Thus, the members of the newspaper publishers' syndicate have lately undertaken to operate paper mills, and are engaged in a battle royal with the syndicate representing the

manufacturers of bleaching powder. There has been some combination among the rolling mills to build and operate steel works, and this has brought them into some conflict with the pig iron syndicate, in consequence of which they are building or acquiring blast furnaces, buying mines and building coke plants.

Those to whom recourse to such heroic expedients is not open, and who, between the high prices charged for supplies of German manufacture and the competition of manufacturers in other countries buying this same material more cheaply than they can get it, find themselves in desperate case, have petitioned the Emperor to take measures to afford them relief. Meanwhile public opinion is rapidly reaching the conclusion that the net result of the syndicate system is to sacrifice the German consumer for the immediate benefit of the producer, and that in the end such conditions will be produced that the whole industrial system of the Empire will go to pieces, like the frog in the fable which inflated itself beyond its safe elastic limit in imitation of the ox. The only action of the Government thus far is the appointment of a commission to inquire into the whole subject and make such recommendations as the facts may seem to warrant.

Assuming the facts to be as stated in the consular reports referred to, it would seem to be evident that the German syndicates have operated thus far on the basis of a false assumption. Combinations to advance prices and maintain them at an artificial level are foredoomed to failure; and if able to hold together and accomplish their purpose for a time, they do so at the expense of the public interest and produce conditions which react upon themselves. The excuse for combination is the opportunity it offers to effect economies which tend to cheapen production; its charter of useful life is its willingness to share with the consumer the economies thus effected. This is a sound economic principle, which no amount of governmental paternalism and no loyalty to pledge of alliance to "do" the consumer can modify, abrogate or nullify. The German manufacturers would do well to send to this country to study the conditions sought, and, in some important lines of production, accomplished by the great mergers which have been formed here. They would find that those which have not been prompt and conspicuous failures have begun by cheapening production in every item, and that while the general conditions have not thus far demanded that this advantage shall be largely shared with the consumer, the successful mergers are those which are in a position to meet any decline which may occur during such period and as the result of such influences as business foresight can predict.

The Cant of "Conservatism."

What is the meaning of all these assurances from men in politics that Congress will be very conservative, and will only change the currency laws a little bit next winter, and will do nothing to "disturb business?" One would suppose that the business community, as a whole, was opposed to any currency legislation, that the politicians felt obliged to do something, but were seeking to allay the natural reluctance of the business world to have the currency touched by the assurance that they would be very careful not to do enough to disturb business. The fact is that the business community has been trying for years to get the men in politics to act, and to act not just a little bit, but to act sufficiently. Was business disturbed by the defeat of silverism? Did the bankers and merchants and manufacturers of the country manifest apprehensions when the act of March 14, 1900, was in preparation, and was the establishment of the gold standard toned down so that action should not be radical enough to disturb business? On the contrary, the business men of the country had been begging Congress for years for more than they got at that time, and a more radical solution of the silver problem would have been welcomed.

Business will not be disturbed by any good financial legislation. The politicians need not fear being radical if they can only be right. So much has been done in the way of patching up a financial system that was devised 40 years ago to provide a war revenue that financiers and the business community may reasonably feel that if Congress is not in a mood to do anything radical it would be better that nothing should be done; sooner or later Congress will do what is necessary, and in the meanwhile it is not certain that any little odds and ends of experimental relief would be worth while.

When the politicians say that they will be very conservative and will not disturb business they mean that they do not know what to do, but feel that they ought to do something; they know there is a good deal of ignorance and prejudice at large, and they are afraid that any financial legislation might be looked upon as a favor to the "money power" and arouse resentment.

Every effort to make the financial system work a little better demonstrates the need of radical change. There is no reason why customs collections as well as internal revenue collections should not be deposited in the banks, but there is much reason to doubt whether the banks care to increase their holdings of public deposits greatly when more money has to be invested in Government bonds than the amount of the deposit, and twice as much must be invested in bonds if other than Government bonds are used. Banks carry a certain amount of bonds, and these they can use advantageously as security for deposits. That they can afford to put their free capital into bonds in order to get deposits, on any large scale beyond what they have at present is open to doubt. For the third year in succession banks are retiring their circulation in order to take advantage of the high price of Government bonds at the very time that more circulation is needed, but the currency laws are such as to make it, for many banks, unprofitable to meet the demand. This points to the fundamental vice of a bond secured circulation, and that is not to be obviated by adding another patch to the system. The Government notes are practically fixed in quantity and constitute a serious obstacle to elasticity, but the politicians are afraid to even discuss their elimination. It is exceedingly doubtful if the device of an emergency circulation would be practicable. The New York Chamber of Commerce last winter disapproved of it. The Comptroller of the Currency has expressed his dislike for the idea. By the theory of the device it is not to prevent stringency, but to check it from going too far. It is extremely improbable that the banks, which have no particular cause to complain of high rates for money, will issue emergency circulation subject to a 6 per cent. tax, when it must inevitably take some time to get the notes in again, and when the special need may last only a very few weeks.

The Secretary is trying to induce banks to increase their circulation by showing them that if they can persuade banks all over the country to sort out their notes and return them they can deposit their own notes in any amount for redemption—the legal limitation of $3,000,000 a month applying only to the amount of lawful money that can be deposited for the redemption of notes. The Secretary touches here on the most important feature of a bank system, the redemption of notes. With an efficient system of redemption a very wide measure of discretion might be left to the banks in the matter of

their circulation. But there is no such system at present, and the Secretary proposes none, and the banks know that they cannot depend upon the voluntary act of all banks which receive their notes.

We have a monetary stringency as regularly as the crops come. For three years in succession the price of bonds has contracted the bank circulation at the moment that expansion was important, and the Secretary is going to "discipline" banks for exercising ordinary business sense. And in the face of this grotesque situation politicians are assuring the business community that they will meddle with the currency laws only a little; they will not "disturb business." If Mr. Gilbert is going to return to the production of comic opera here is a suggestion for him.

New Publications.

The Transaction of Business and How to Win Fortune. Edited by David E. Goe. Eddy Publishing Company, Madison, Wis. Pages, 134.

This most interesting volume is a compilation of essays on business, comprising "The Transaction of Business," by Sir Arthur Helps. "How to Win Fortune," by Andrew Carnegie, four short essays by Francis Bacon, and "Get Out or Get in Line," by Elbert Hubbard. It is graced with a very fine portrait of Andrew Carnegie, to which Mr. Carnegie's autograph is added. The editor's introduction to this compilation of essays gives his special reasons for having grouped them in one volume. He intimates that, as a class, business men have been bending over the counter and the cost sheet too diligently to see the finer fibers of their work. They have regarded business with a sordid and mercenary affection. In the intervals of business it has been his pleasant fortune to have his attention directed to some of the literary lore of business. He believes that there are a few thousand other men immersed in the details of business who will read these essays with an equally keen relish of their wit, wisdom and intensely practical advice and suggestions. The selections which Mr. Goe has made for his little volume are certainly most admirable, and other men will be able to put in an exceedingly profitable hour in reading and absorbing the sound doctrines and good common sense with which every page abounds. The arrangement of the contents is original and striking. Each chapter is introduced by an appropriate quotation, often taken from some business publication or periodical.

The Metallurgy of Zinc and Cadmium. By Walter Renton Ingalls, metallurgical engineer. The Engineering and Mining Journal, publishers, 261 Broadway, New York, and 20 Bucklersbury, London, E. C., England. Pages, 701. Price, $6, or 25 shillings.

The author of this work is one of the ablest experts on the subject, and the book is the only special treatise on the metallurgy of zinc ever issued in the English language. Such essays on this subject as have been published in generally available form are embodied in hand books on general metallurgy and industrial chemistry, which being necessarily brief fail to describe adequately the modern practice in this branch of metallurgy. The treatise has been purposely given an encyclopaedic character, going minutely into descriptions of many furnaces and processes which are old and out of date and many new ones which have not been tried practically, partly because the metallurgy of zinc has not yet crystallized to the stage where certain methods can be definitely pronounced best or pointed out as indicating the only lines to follow in modern practice, and partly because a record of all that has been done is useful as the basis for new experimental work. The list of chapters is as follows: Zinc and Its Ores; Calcination of Calamine; Blende Roasting; Roasting Furnaces; Utilization of the Sulphurous Gases; General Principles of Zinc Distillation; Retort and Condenser Manufacture; Fuel and Systems of Combustion; Chimneys, Heat Recuperation and Furnace Design; Types of Distillation Furnaces; Practice in Distillation; Losses in Distillation; Refining Impure Zinc and Composition of Commercial Spelter; Cadmium and Its Recovery; Cost of Producing Zinc; Design and Construction of Smelting Works; Examples from Practice; Proposals to Smelt Zinc Ore in the Blast Furnace; Manufacture of Zinc White, Zinc Gray, Zinc Chloride and Zinc Sulphate. The work is profusely illustrated, and it will undoubtedly be greeted as a most valuable acquisition to metallurgical literature.

Engineering Preliminaries for an Interurban Electric Railway. By Ernest Gonzanbach. McGraw Publishing Company, 114 Liberty street, New York. Cloth. Pages, 72. Price, $1.

This work has been published in view of the present interest in interurban railway development and engineering. It comprises the plans and recommendations embodied in the report on a proposed railway in the Middle West, which serves as a good example of many roads now on paper, and which may soon assume tangible form. It is not presented as an attempt to generalize and instruct others in the art of railway construction, but is intended to show the way in which certain conditions were to be met in a certain case, together with the reasons which led up to the recommendations and plans therein submitted. As a practical contribution to engineering literature this work will undoubtedly be received with much interest. The author states that he hopes there may be fewer interurban roads built which deserve the appellation bestowed upon them by a well-known engineer, "monuments of efficient salesmanship." It is further his hope that this series of articles will aid toward securing a permanent standard of construction without lavishness or excessive cheapness.

Trade Publications.

Tariffs of English Speaking Countries.—The *Canadian Manufacturer*, Toronto, Canada, has published under date of September 4 the complete official texts of the tariffs of Canada, the United States, Great Britain, the Commonwealth of Australia and British South Africa. No other journal has ever published these tariffs in the same issue. As presented in the *Canadian Manufacturer* they must necessarily be of great value to those who may be interested in commercial transactions between the five great English speaking countries of the world. Single copies of this edition will be supplied by the journal referred to at 50 cents per copy

The Reciprocity Treaties.—The American Protective Tariff League, 339 Broadway, New York, in conducting their campaign against reciprocity in competitive products, have issued Document No. 43, entitled "Reciprocity and Tariff." This work comprises 32 pages and includes all the reciprocity treaties now under consideration by Congress, the editorial opinions of the late Speaker Reed on the Cuban treaty and an exhaustive treatise on the constitutionality of reciprocity treaties by former Representative Sheldon of California. Copies of this document will be sent to any address for 4 cents.

The Chicago Plug Drill.—The Chicago Pneumatic Tool Company, general offices at Chicago, are mailing to the trade Circular No. 42, which embodies a complete line of stone cutting tools. Attention is called especially to the Chicago plug drill, a new device manufactured by the company. The plug drill is adapted to all classes of plug and feather operation; the light weight, 18 pounds, permitting it to be advantageously used for either top or side line work, but one hand being required to operate the tool.

Malleable Castings.—Wm. E. Pratt Mfg. Company, works at Joliet, Ill., and office at 91 Lake street, Chicago, have recently issued a small pocket pamphlet of testimonials in regard to their malleable castings. The company announce that in addition to a large tonnage of malleable castings they are prepared to make brass patterns.

Blowers and Engines.—The National Blower Works of Milwaukee, Wis., furnish and install complete heating and ventilating systems; also drying apparatus for lumber, grain, fruit, &c. In addition they provide fans and coils for malt houses, planing mill exhaust systems, dust collectors and mechanical draft outfits. Their full housing steel plate steam fans are provided with an engine secured to the side opposite the inlet. The housing is of heavy steel plate, stayed with steel angles on the sides and supported on a heavy steel angle base. The wheels are substantially built, the arm being of T-steel cast into the hubs. The side plates and floats are of sheet steel securely riveted and bolted, while the shaft is steel running in self oiling boxes. Two types of engines are furnished, one with the cylinder above the shaft and the other with the cylinder below the shaft. These blowers are made in sizes from 60 to 200 inches.

A very elaborate catalogue has been received from the New-

ton Machine Tool Works, Incorporated, Philadelphia, Pa., describing their plain milling machines, duplex milling machines, slabbing machines, milling cutters and cutter grinders, rotary planers, drilling machines, slotters, floor boring and milling machines, drilling machines and cold saws.

Aerial Tramways.*

BY STEPHEN DE ZOUIBORIA, ST. LOUIS.

In addressing you upon the subject of aërial tramways as an economical means of transportation, it is not my object to enter into a technical discussion of the subject, but rather to discuss the conditions which warrant the construction of such aids to mining enterprises and those types which will give the most satisfactory results from the mine operator's point of view, as well as some of the many advantages of this system of transporting ores from the mine to the reduction plant. The time is too short to enter into an extended discussion of tramways and their development. As a curious fact, we could mention that wire ropes served for transportation methods many centuries past, and research among the ruins of Pompeii have brought to light wire rope, specimens of which are to be seen in museums in Naples at this day. Or I could mention, too, that there are wood cuts in some of the mediæval German books which show perfectly developed tramways. The early methods of this mode of transportation passed into oblivion, however, and it was not brought again into extended use until the '40's of the last century.

Almost from the origin of trams we find that two distinct types were known—the single and the double rope tram. The home of the former was in England, while the double rope system is extensively used in Germany and elsewhere throughout the world. So widely spread is the use of rope tramways that it is also interesting to note that in Germany there is a single manufacturing concern which, during the quarter of a century that it has been in existence, has turned out over 1800 tramways. The experience of the past two or three decades has shown many marked advantages of this type of transportation.

Advantages of Rope Tramways.

Discussing the merits of both the single and double rope types, the advantages might be expressed thus: Underlaid profile is of little importance, since these tramways are equally effective on plains or in a very mountainous country. Expensive understructures, viaducts or trestle work are absolute unnecessary, the ropes being suspended on wooden towers, which are of simple construction, erected at intervals of 200 or 300 feet. If the formation of the ground does not permit these distances, it is possible to construct spans of even 2000 or 3000 feet. Deep gulches and ravines, which are effectual barriers to transportation of other types, offer no obstruction to a rope tramway, and some of the finest tramways in the country have solved just such problems for mine operators. Climatic conditions in no manner interfere with the action of a tramway, permitting continuous operation in most inclement weather. Thus the heavy expense of keeping mountain roads open during the winter is avoided. Being economical both of construction and maintenance, it proves to be the real friend of mine operators who are operating on even a moderate capital.

Another marked advantage is the fact that the time occupied in construction is much less than for the construction of other systems of transportation. Especially is this true in mountainous country. The adaptability of the tramway is so great that it will meet the most urgent demands made upon it, and, unlike rail or wagon roads, should occasion demand, the plant can be wrecked and installed in a new location at moderate cost and with a surprisingly short loss in operating time.

The Single Rope System.

In the main, these advantages apply to both the single and double rope types. I do not feel myself entitled to condemn either type. Both have their advantages. I will only compare them. The single rope type being much simpler in its construction, having less parts, has the advantage in being cheap in primary cost and erection. Its principal drawback is that it can convey only a limited amount of material. There are tramways of this system with an hourly capacity of 35 tons, yet these particular tramways have not gone beyond the experimental stage, and it is not advisable to deliver more than 20 tons per hour. The practical mine operator whose hope and ambition is to vastly increase the output of his mine, would hardly consent to install a system which in itself is of so limited capacity. Yet its main advantage, as stated, is its cheapness of construction—a fact which always must be taken into consideration.

Another disadvantage of this system is the fact that the strain upon the parts is heavy, with consequent expense of repairs and loss of time in operation, itself no small item in working costs.

The Double Rope System.

The double rope system, which is of far more extensive use, is more costly in installation, but is always advantageous on account of its capability of increased capacity as occasion demands in the future development and output of a mine. Speaking of capacity, I may mention a line which delivers 250 tons of ore per hour, which is really a tremendous output. This special line has been in almost continuous operation since the fall of 1898, and since its installation its repairs have been of such trifling cost that even its builders have been surprised. Operating costs are low. One Colorado tramway, which traverses a very rough montainous country, approximately 10,000 feet in length, is handling ore at a cost of 17.6 cents per ton, with the cost of maintenance 1.5 cents per ton. These remarkably low figures are due to the fact that the systems now being perfected require the services of very few men on the entire line. The addition of automatic dvices, which perform the work of loading and dumping, has gradually decreased the labor costs until now only one or two men are required to watch the loading of the buckets. As is generally understood, most of the double rope tramways which are in operation through the mining districts of the country require no power, being operated by gravity entirely. Even then the power which is produced by the weight of the buckets can be turned into a source of profit, being sufficient to meet demands for ventilating purposes, for the operation of dynamos for lighting plants and operating mine pumps, as can be seen in some of the larger Western mines.

The division of the strain upon the ropes in the double rope system reduces the repair bills, and at the same time renders stoppages less frequent.

Limit to Automatic Appliances.

Returning for a moment to the matter of automatic systems: There is to-day a tendency to render these tramways more and more automatic in their operation. It is a question in the mind of the trained engineer just what is the limit. What is of more concern to the prospective or actual owner of a tramway is, "How far can we go in making the tram entirely independent of human control, and then take the risk of the eventualities which are connected with all such machinery?"

Reduction of labor cost is always an object in considering operating costs, yet it is the opinion of many engineers that it will not be advisable to entirely dispense with it. The aim of the constructing engineer should be to plan a tramway, which would be as nearly automatic as is consistent with due regard for the safe conveyance of its traffic.

Construction of Double Rope Systems.

In all the double rope systems which are in general use the principle of construction is the same. That is, the ropes, pulleys and sheaves, as well as the other machinery in use, perform their duties in the same general fashion, differing only in design. The difference between the systems is chiefly in the manner of attaching buckets to the rope. Therefore, double rope tramways might be divided into three general types:

1. That system in which a clip or lug nut is permanently attached to the running rope, which drags the bucket suspended on a standing or immovable rope. 2. That system in which a clutch attached to the bucket

* Address before the American Mining Congress, Deadwood, S. D., September, 1903.

seizes the running rope and remains attached thereto by means of friction. This might be further subdivided into two classes, one in which the friction is created by an eccentrically operating lever locked and released automatically, securing a constant friction that is independent of the angle which the traction rope forms with the horizontal, and another in which the clutch exerts friction on the traction rope by a lever on which the weight of the bucket is transmitted. This friction varies with the cosine of the angle the line forms with the horizontal. 3. The third and latest development is that system in which the buckets are fastened permanently at certain distances to the traction rope. On this system the buckets are loaded with a walking bin, which runs simultaneously on parallel rails above the buckets in the station, loading them.

I will mention some of the most marked differences in these three systems of double rope tramways. The clip system enables us to handle the buckets at exactly the same intervals. This prevents accidents which might result from the failure of laborers to keep the buckets loaded and moving at the proper distances. One marked disadvantage of this type is the fact that the wear on the traction rope is constantly in the same place, thereby weakening the strength of the rope at these points. Shifting the clips from time to time is resorted to in an effort to overcome this difficulty but with a more or less extended loss of time.

In the second class this difficulty is not encountered because the grip seldom clutches the same spot on the traction rope twice in succession. Slight alterations, also, in the relative position of the buckets on the rope work no disadvantage in the operation of this second type. To secure an even distribution of the buckets along the line signals are easily arranged by which the workman is enabled to estimate the proper intervals. With the assistance of the eccentrically working frictional grip arrangement as well as with the clip all grades can be overcome, because the friction upon the traction rope is constant and uniform. In the type in which the weight of the bucket is transferred by means of a lever on the clutch and is transformed to friction, the limitation of grades to be overcome is confined to those not in excess of 45 degrees.

The third system, that in which the buckets are attached permanently to the traction rope, is probably the most promising one, as here the loading as well as the unloading of the buckets is automatic, with corresponding savings in operating costs. The more or less complicated grips and clip catchers are done away with. It requires buckets of less expensive construction and overcomes any grade that any other system of rope tramways can traverse. This last type of construction is of such recent development that comparatively few plants are in operation in this country. As far as is known, it renders most successful service.

Cost of Installation.

And now a word as to the cost of installation of rope tramways. Naturally, the single rope tramway is the cheaper type of construction, but popular opinion is more favorable toward the double rope tramway, as evidenced by the number of that type which have been and are being installed by mine managers. The heavier the traffic to be handled the heavier and more substantial must be the parts used in the construction work. Many other considerations, based upon the peculiar conditions which attend the installation of tramways at different mines, must be considered in the individual case. Generally speaking, we are within limits when we say that, including all the machinery parts, the average price per foot of line constructed may be regarded as ranging from $1.80 to $2. These figures include the necessary wire cables, towers, sheaves and buckets. To these figures must be added the construction costs, which vary according to freight rates, prices of timber, labor and delivery to the point of construction. Very naturally, this affords a wide variation in costs, but as an example it might be cited that in Colorado the construction costs would probably be from $1 to $1.15 per foot. Therefore, it is safe to estimate the entire cost of a tramway per foot in this region, where the conditions are approximately the same as in Colorado, at from $3 to $3.10 per running foot.

The subject of rope tramways and their application to mining and manufacturing industries the world over is a subject upon which any engineer might talk for hours. The economies which are effected in all industries in which their use is possible are so generally recognized that no argument in their behalf is necessary. Every mining man of the West can probably cite examples of mines whose profitable operation without the aid of tramways would not be possible. In conclusion, let me repeat a beautiful tribute to the tramway, the work of a fellow engineer unknown to me, whose beautiful allegory is more expressive than language of my own:

Nestled silently in the clouds, away up above the timber line, nature has hidden almost unaccessibly its treasures. Deep down below in a valley stands a reduction plant which day by day with the aid of human genius converts ore into wealth. Reluctant to give up her treasures, nature wages a constant warfare with man, calling to her aid the snows and ice of winter, altitude, precipice and ravine. But man won the fight. Two slender wire cables, puny in appearance despite their strength, span ravine, rise over precipice and scale the hights, disappearing among the clouds. With their aid man has encompassed the defeat of nature. Silently, unpretentiously, disdainfully ignoring the grumbling of nature over her defeat and her efforts to overthrow the work of man, the cables modestly move forward, the connecting link between mountain and valley, a private soldier of the mining industry, always alert, always performing his duty, always obeying his commands and rendering invaluable service in adding to the wealth of the nation.

Meeting of Eastern Furnacemen.

A meeting of representatives of the furnace companies of Eastern Pennsylvania and New Jersey was held in the office of Rogers, Brown & Co., New York City, on September 22. The object of the meeting was the consideration of the present condition of the pig iron trade. No action was taken regarding prices, nor was any schedule adopted to govern the furnacemen in any other way. The question came up, of course, as to whether it was advisable to undertake any restriction of output. It was decided, however, that no formal restriction of output could be carried through. Nevertheless, it was the sense of all present that the production should, if possible, be limited to consumption. The representatives of the several companies will each decide for himself relative to the cessation of operations, but it was regarded as inevitable that a further shutting down of blast furnaces must take place. Another meeting will be held within a few days, which will be called by L. Peckitt, president of the Empire Steel & Iron Company, who acted as chairman of the recent meeting. It is recognized that many circumstances have to be considered in bringing about a restriction of production. Nearly every furnace company have some orders which must be filled, very few being in such a position that they are compelled to attempt to market their entire output. Those having the fewest orders on their books are, as a matter of course, in the best position to discontinue operations at an early date.

In connection with the air ship contest, which is made a part of the Louisiana Purchase Exhibit, a motor has recently been built by a Jersey City firm which, operating on four strokes per cycle, develops 2¼ horse-power on a weight of 24¼ pounds. The addition of the carbureter brings the weight up to 25½ pounds, while a friction clutch and fly wheel pulley further increase it to 33½. Free use has, of course, been made of aluminum wherever practicable, and numerous other weight saving devices have been adopted, among them being the discarding of the usual radiating ribs around the cylinder barrel.

John Eaton, president of the Oil Well Supply Company, at Pittsburgh, Pa., will make a five months' tour of the world. Mr. Eaton will leave for the West on September 26, and on October 23 he will meet his family at San Francisco, when the party will sail for Japan. They will return to the United States by way of England.

Labor News.

Eighty employees of the H. B. Smith Company, Westfield, Mass., went on strike September 11 on the nine-hour issue. The men had asked for a nine-hour day with the old schedule of wages, naming September 1 as the date upon which they expected an answer. The demand was not granted. The strikers were employed in the company's boiler works, where there are in all 250 hands. The strikers are members of the Metal Workers' Association, and no other branches of the H. B. Smith Company's force are affected, including the molders. The places of some of the strikers have been filled with unskilled help.

The blacksmiths employed at the Boston & Albany shops at Allston and Springfield, Mass., are on strike because of the railroad's refusal to grant them a nine-hour day with the old ten-hour wages. It is generally expected that the matter will be adjusted at an early date, as was the strike of the company's machinists, who recently went out at the same shops. About 60 men are out.

On September 16 press dispatches from Chicago stated that "the National Metal Trades Association has started a movement to reduce the wages of machinists all over the country 10 per cent." E. F. Du Brul, as commissioner of the National Metal Trades Association, brands this statement as a deliberate and malicious untruth. In the first place, the association does not concern itself with questions of wages, those being matters of individual adjustment between employer and employee. In the next place, the association has not met since April 2, 1903, therefore it could not have taken any action on that question, so that the whole statement is a tissue of falsehood. Mr. Du Brul says that there can be only one explanation as to who is circulating such statements and the reason therefor, and that is, that some parties conceive it to be to their interest to stir up trouble between the members of the association and their employees and are deliberately circulating such reports with that intention. He further says:

> As to the individual feeling of the members of this association, I may say that I do not know of any member who is even contemplating a reduction of wages. The general feeling of our members is that wages are as high as business conditions warrant, and that while further increase of wages cannot be made, there is no disposition to make any reductions. If there were, as commissioner of the association, I would certainly have been notified of the fact, because an effort to reduce wages at the present time would probably provoke strikes, and no member of the association is allowed to take any action that would be likely to provoke a strike in his establishment without first notifying this office. Furthermore, I wish to say that any news regarding the National Metal Trades Association that does not emanate from its accredited representatives is probably as false as the statement issued from Chicago.

Work on the mile long Susquehanna bridge at Harrisburg, Pa., and the new open hearth department of the Central Iron & Steel Company, at the same place, both of which are being built by the Pennsylvania Steel Company of Steelton, Pa., is tied up by a strike of the structural iron workers. The employment of nonunion men at the Steelton mills is given as the cause.

The boiler makers of McDermott Bros., Callum & Knouse and the Heilman Boiler Works of Allentown, Pa., went on strike September 16. They ask 35 cents an hour for a nine-hour day, instead of 23 cents an hour, and the companies have refused the demand. About 300 men are affected.

It was decided at the meeting of the Executive Committee of the National Association of Manufacturers, held in New York on September 18, that the work of organizing the employers of the United States, to place them in a position to cope with organized labor, should begin without delay. President Parry was given full power to proceed at once in the matter, and will shortly issue a call, asking all trades and employing associations, citizens' alliances, manufacturers' clubs and associations, and all business organizations in general, to elect delegates to a convention at which shall be taken the preliminary steps toward forming a national federation or association of employers, composed of the organizations named. This is the development of the suggestion made by President Parry at the New Orleans convention of the National Association of Manufacturers. It is the belief of the association that it is time to act without delay, and that the plan decided on is the best method of getting at the union labor problem.

The National Tube Company of Pittsburgh have started up their Continental works in that city with nonunion men. The National Tube Company refused to sign the Amalgamated scale for puddling for this plant, but agreed to pay scale rates. The men refused to return to work and have been on strike ever since. They claim they have not received any strike benefits from the Amalgamated Association, and unless these are soon paid the men will likely return to work without the scale being signed.

A circular letter to local unions of machinists from James O'Connell, president of the International Association, directs that discretion must be exercised in the manner of strikes, which, he says, should be avoided if possible. He points out that there are at present over 100 strikes among machinists of the country and that additional strikes would severely tax the funds of the International. The circular says a number of shops have done away with their night shifts, thus throwing many machinists in the field, and that in some cases these men have had offers of work at 10 per cent. below what they had been getting.

The 550 employees of the Sterling Electric Works, Lafayette, Ind., petitioned the company to extend the summer Saturday half-holiday to all the year round. The company answered that they were unable to do so on account of the volume of business ahead. The employees did not press their request further.

Knowing that the men in their employ were about to declare a strike, the officials of the Stark Rolling Mill Company, Canton, Ohio, posted a notice recently stating that the plant would be closed down for an indefinite period, and it is now idle in all departments. The management had announced that unless the men would agree to operate the sheet mills without regard to limitation of output the works would close. The men refused to grant the request and were preparing to go on strike. The Stark Rolling Mill Company are manufacturers of common, cold rolled, pickled and annealed sheet steel.

The Pennsylvania Steel Company's structural iron workers' strike in Harrisburg has been settled and the men have returned to work. The union withdrew its objection to the employment of nonunion men on certain lines of work at the mills.

An order has been granted by Supreme Court Justice Davy directing that William C. Mount, business agent of the Machinists' Union, at Rochester, N. Y., appear before a referee and give evidence in the $20,000 damage action against the union, which has been instituted by the W. P. Davis Machine Company. The action is to be pressed against the president of the union, Henry Robinson, as well as other individual members. The order was granted as the result of a motion made by William P. Davis, in which it was stated that the matter of a strike in the plaintiff's shop was taken up at meetings of the Machinists' Union and that plans for the conduct of the strike were made. The granting of this order is another step in the warfare which is being waged against the labor unions in Rochester by the employers.

The Morse Iron Works of Brooklyn and the Burlee Dry Dock Company of Staten Island have brought civil action against the International Association of Machinists to recover $20,000 damages. The case will deter-

mine the right of the labor unions to arbitrarily order a strike when there is no just cause.

It is said that the Amalgamated Association at Pittsburgh, Pa., is trying to organize lodges among employees of the National Tube Company, at McKeesport, Pa. This plant has been nonunion for many years, and probably will continue so.

Schedule of Billet Prices.

Press reports last week, said to have been started largely for stock jobbing purposes, had it that the price of billets was to be reduced $2.50 a ton at the meeting of the Billet Association, held in New York on Thursday, September 17. No such action was contemplated by the steel manufacturers, the meeting being held for the purpose of taking up routine matters. The only actual change made in prices was to Washington, Pa., which was reduced from $27.75 to $27.50 delivered. A few new points of delivery were also added. The schedule of prices on billets, sheet and tin bars, with extras and terms, as reaffirmed at the meeting on September 17, is as follows:

Base Price for Billets and Slabs 4 Inches and Larger.

Albany, N. Y.	$28.75	Granite City, Ill.	28.75
Atlanta, Ga.	29.25	Grand Crossing, Ill.	28.00
Allentown, Pa.	28.25	Harrisburg, Pa.	28.00
Apollo, Pa.	27.50	Hollidaysburg, Pa.	27.50
Ashland, Ky.	27.00	Hamilton, Ohio.	27.75
Anniston, Ala.	29.25	High Bridge, N. J.	28.75
Averyville, Ill.	28.25	Harrison, N. J.	28.75
Auburn, N. Y.	28.25	Harriman, Tenn.	29.25
Akron, Ohio.	27.50	Indiana Points.	28.25
Alliance, Ohio.	27.50	Ironton, Ohio.	27.00
Aliquippa, Pa.	27.50	Irwin, Pa.	27.50
Altoona, Pa.	27.50	Johnstown, Pa.	27.00
Allegheny, Pa.	27.00	Jersey City, N. J.	28.75
Avenue, Pa.	27.50	Jenkintown, Pa.	28.25
Avonmore, Pa.	27.50	Joliet, Ill.	28.00
Buffalo, N. Y.	27.75	Kansas City, Mo.	29.75
Bethlehem, Pa.	28.25	Kewanee, Ill.	28.25
Baltimore, Md.	28.25	Kalamazoo, Mich.	28.25
Birmingham, Ala.	29.25	Knoxville, Tenn.	29.25
Blairsville, Pa.	27.50	Kittanning, Pa.	27.50
Brierfield, Ala.	29.25	Louisville, Ky.	28.25
Belleville, Ill.	28.75	Leechburg, Pa.	27.50
Boonton, N. J.	28.50	Leetonia, Ohio.	27.25
Bridgetown, N. J.	28.75	Lebanon, Pa.	28.25
Brooklyn, N. Y.	....	Latrobe, Pa.	27.50
Bridgeport, Ohio.	27.00	Lancaster, Pa.	28.25
Bellaire, Ohio.	27.00	Los Angeles, Cal.	39.25
Birdsboro, Pa.	28.25	Lockport, N. Y.	28.25
Blandon, Pa.	28.25	Lorain, Ohio.	27.00
Bellefonte, Pa.	28.25	Lima, Ohio.	28.00
Berwick, Pa.	28.25	Lewisburg, Pa.	28.25
Bristol, Pa.	28.25	Lock Haven, Pa.	28.25
Burnham, Pa.	28.00	Monessen, Pa.	27.50
Beaver Falls, Pa.	27.50	Marietta, Ohio.	27.50
Braddock, Pa.	27.00	Middletown, Ohio.	27.25
Benwood, W. Va.	27.00	Morgantown, W. Va.	28.25
Butler, Pa.	27.50	Milwaukee, Wis.	28.00
Braeburn, Pa.	27.50	Milton, Pa.	28.00
Bordentown, N. J.	....	Marshalltown, Del.	28.25
Colonial, Pa.	27.50	Maywood, Ill.	28.00
Cortland, N. Y.	28.25	Moline, Ill.	28.25
Clarksburg, W. Va.	28.25	Melrose Park, Ill.	28.00
Clairton, Pa.	27.00	Muskegon, Mich.	28.25
Cleveland, Ohio.	27.50	Middletown, N. Y.	28.75
Chicago, Ill.	28.00	Massillon, Ohio.	27.50
Columbus, Ohio.	27.75	Martin's Ferry, Ohio.	27.00
Cincinnati, Ohio.	27.75	McKeesport, Pa.	27.00
Covington, Ky.	27.75	Mingo Junction, Ohio.	27.00
Canton, Ohio.	27.50	Newport, Del.	28.25
Cambridge, Ohio.	27.50	New Castle, Del.	28.25
Canal Dover, Ohio.	27.50	Niles, Ohio.	27.00
Chattanooga, Tenn.	29.25	Norristown, Pa.	28.25
Cohoes, N. Y.	28.75	Newark, N. J.	28.75
Cuyahoga Falls, Ohio.	27.50	New York, N. Y.	28.75
Canonsburg, Pa.	27.50	Newport, Ky.	27.75
Connellsville, Pa.	27.50	Newark, Ohio.	27.50
Charlerol, Pa.	27.25	Newcomerstown, Ohio.	27.50
Carthage, Ohio.	27.25	New Philadelphia, Ohio.	27.50
Cumberland, Md.	27.50	Newburg, N. Y.	28.75
Carnegie, Pa.	27.50	New England points.	29.25
Columbia, Pa.	28.25	Northumberland, Pa.	28.00
Chester, Pa.	28.25	New Kensington, Pa.	27.25
Crumlynne, Pa.	28.25	Oil City, Pa.	27.75
Conshohocken, Pa.	28.25	Oxford, N. J.	28.75
Catasauqua, Pa.	28.25	Paterson, N. J.	28.75
Coatesville, Pa.	28.25	Pompton, N. J.	28.75
Duluth, Minn.	29.00	Poughkeepsie, N. Y.	28.75
Danville, Pa.	28.25	Port Chester, N. Y.	28.75
Duncansville, Pa.	27.50	Portland, Ore.	39.25
Detroit, Mich.	28.25	Pine Iron Works, Pa.	28.25
Denver, Col.	40.25	Philadelphia and immediate vicinity.	28.25
Dover, N. J.	28.75	Perth Amboy, N. J.	28.75
Douglasville, Pa.	28.25	Pittsburgh, Pa.	27.00
Duncannon, Pa.	28.00	Parkersburg, W. Va.	28.25
Demmler, Pa.	27.00	Pottstown, Pa.	28.25
Donora, Pa.	27.00	Pottsville, Pa.	28.25
Ellwood City, Pa.	27.25	Portsmouth, Ohio.	27.25
Edge Moor, Del.	28.25	Piqua, Ohio.	27.75
Elizabeth, N. J.	28.25	Pueblo, Col.	40.25
East St. Louis, Ill.	28.75	Pullman, Ill.	28.00
Etna, Pa.	27.00	Phillipsburg, N. J.	28.75
Easton, Pa.	28.75	Rock Island, Ill.	28.25
Erie, Pa.	27.75	Rochester, N. Y.	28.25
Eusley, Ala.	29.25	Richmond, Va.	28.75
Franklin, Pa.	27.75	Roanoke, Va.	28.75
Findlay, Ohio.	28.00	Reading, Pa.	28.25
Greensburg, Pa.	27.50	Rome, Ga.	29.75
Glassport, Pa.	27.00	Rome, N. Y.	28.75
Riverside, Ohio.	27.75	Trenton, N. J.	28.75
Rankin Station, Pa.	27.00	Troy, N. Y.	28.75
St. Louis, Mo.	28.75	Thurlow, Pa.	28.25
Springfield, Ill.	28.25	Titusville, Pa.	27.75
Syracuse, N. Y.	28.25	Tyrone, Pa.	27.50
Scranton, Pa.	28.25	Valley points.	27.00
Seattle, Wash.	39.25	Verona, Pa.	27.25
Swissvale, Pa.	27.00	Wheeling, W. Va.	27.00
Saltsburg, Pa.	27.50	Wyoming, Pa.	28.25
Steelton, Pa.	28.00	Waynesboro, Pa.	28.25
Sharon, Pa.	27.00	West Leechburg, Pa.	27.50
Sunbury, Pa.	28.00	Waukesha, Wis.	28.00
Stirling, Ill.	28.25	Worcester, Mass.	29.25
Sharpsburg, Pa.	27.00	Waukeegan, Ill.	28.00
Shackamaxon, Pa.	28.25	Wilkes-Barre, Pa.	28.25
San Francisco, Cal.	39.25	Wellsville, Ohio.	27.25
St. Joseph, Mo.	29.75	Wilmington, Del.	28.25
Spuyten Duyvil, N. Y.	28.75	Washington, Pa.	27.50
Steubenville, Ohio.	27.00	Watsontown, Pa.	28.00
Schuylkill Haven, Pa.	28.25	Wyandotte, Mich.	28.25
Seyfert Station, Pa.	28.25	West Bergen, N. Y.	28.75
Slatington, Pa.	28.25	Williamsport, Pa.	28.25
Toledo, Ohio.	28.25	York, Pa.	28.25
		Zanesville, Ohio.	27.50

Bessemer steel: Extra for carbon:

Up to and including 0.25 carbon	Base.
0.26 to 0.60 carbon	$1.00
0.61 to 1.00 carbon	2.00

Open hearth steel: $1 per ton extra over price of Bessemer.

Extras for carbon:

Up to 0.60 carbon	No extra charge.
Over 0.60 carbon	$2.00

Extras for both Bessemer and open hearth steel:

Billets smaller than 3⅞ inch and sheet and tin bars, $1 per ton extra.

For cutting small billets, sheet or tin bars, 50 cents per ton extra.

Slabs 16 square inches in area and larger, base price.

Lighter slabs, same extra as sheet bars.

Open hearth forging blooms, billets or slabs, $3 per ton extra, which is in addition to the regular extra of $1 per gross ton for open hearth quality, and which is also in addition to the extra for sizes, it being understood that when a customer requires forging quality, or when the seller has reason to believe the steel is to be used for forging purposes, the $3 per ton extra for forging steel must be added. This applies to all sizes 4 inches square (or 16 square inches in area) and above. For sizes below 4 square inches, in case buyer does not specify forging steel, the seller is at liberty to add only the extra due to size.

All quotations shall cover delivery at final destinations—i.e., at point of proposed consumption.

Terms, 30 days from date of invoice, with privilege of discounting at the rate of 6 per cent. per annum for unexpired term, or one-half of 1 per cent. discount for cash against sight draft, bill of lading attached.

The Amalgamated Association.—Reports in the daily press that a special convention of the Amalgamated Association was to be held in Pittsburgh, Pa., at an early date, and that a fight would be declared on the nonunion mills operated by the United States Steel Corporation are untrue. It is a fact, however, that a special meeting of officials of the Amalgamated Association is to be held in Pittsburgh on September 25, to take up charges made against President Shaffer of the association. It is alleged that President Shaffer has neglected his duties as executive head when he failed to attend the meeting of vice-presidents recently held in Cleveland, and also when he failed to attend the special meeting of sheet workers held in Pittsburgh about two weeks ago. It is rumored that President Shaffer may resign before the meeting is held on the 25th, and in that event he will be succeeded either by John Williams, now secretary, or M. F. Tighe, assistant secretary. Matters in the Amalgamated Association have not been working smoothly for some time, and there is great dissatisfaction among the members, owing to the fact that the organization seems to be losing its prestige and is in a fair way to be disrupted altogether.

A comparison between the heating properties of acetylene and city illuminating gas shows that the heat units developed per cubic foot are 1850 and 630, respectively, the temperature of the acetylene flame being about 2600 degrees F. With an acetylene burner consuming 2 cubic feet per hour one quart of water was brought from a temperature of about 50 degrees F. to the boiling point in 8½ minutes. With the same vessel and the same amount of water, at the same initial temperature, it required 10¼ minutes for the illuminating gas to accomplish the same result, though flowing from a burner consuming 16 cubic feet per hour.

The Canadian *Mining Review* points out the fact that in 1901 the mineral products of Canada were, in round numbers, $66,000,000, of which $42,000,000 represented metallic and $24,000,000 nonmetallic materials. Compared with the total of the United States for the same period, $1,092,000,000, this does not seem large, but when the relative populations are taken into consideration, it is seen that Canada produced $12.42 per capita, and the

United States $14.12, a difference of only $1.70 per head. In 1891 the metal output of the United States was 55 times as great as that of Canada, but in 1901 it was only 12½ times as great.

OBITUARY.

NATHAN WASHBURN.

Nathan Washburn, who for several decades previous to 1870, was one of the most prominent of American iron and steel manufacturers, died on September 13 at Stafford Springs, Conn., at the age of 85 years. He was born in Tolland, Conn., in April, 1818. His first employment was with the W. A. Wheeler iron foundry at Worcester, Mass., and a year later he associated himself with a cousin, Augustus Washburn, in a foundry at Fitchburg, Mass. In 1844 he returned to Connecticut and established a foundry at Stafford. It was there that he conceived the idea which led to the chilled car wheel. One of the pulleys in his foundry had received a peculiar strain and was constantly breaking, and a pulley having a double plate was substituted for it. The new pulley worked so well that Mr. Washburn determined to apply it to car wheels. He worked out the idea at Stafford and later at Rochester, N. H., where he established a business for the casting of parts for cotton and woolen machinery. Finally in 1852 he patented and brought out the Washburn chilled car wheel and began its manufacture at Stafford, after disposing of his Rochester interests. His partner was E. A. Converse of Stafford, the firm name being Converse & Washburn. A foundry for the casting of car wheels was built at Troy, N. Y., but the principal plant was established at Worcester, where in 1857 the large plant was erected since known as the Worcester Steel Works. The partnership with Mr. Converse lasted two years, and afterward he associated with him George W. Gill of Worcester. The car wheel business was then combined with the manufacture of rails for steam roads. In 1860 240 men were employed, the pay roll amounting to $7000 a month. Capital to the amount of $500,000 was invested in the business. The daily product was 40 tons of rails, 4 tons of steel tires for locomotive wheels, 40 car wheels and 8 tons of machine castings. Besides the Worcester plant that of the Schenectady Locomotive Works was leased in 1856 for the manufacture of wheels. In 1859 Mr. Washburn built iron works at Toronto, Canada, Canadian capitalists joining him in the venture, the purpose being to provide rails for the Grand Trunk Railroad. In 1858 Mr. Washburn invented a machine for rolling locomotive tires. At one time he did a large business at Worcester in the manufacture of rolled gun barrels. For a long time the gun iron was imported from England, but Mr. Washburn discovered a process by which he could puddle the steel and he then manufactured a better gun barrel than his English competitors. He opened iron mines and established blast furnaces at Canaan and Salisbury, Conn. In 1881 the rail business came to an end for the Worcester plant, and in 1888 the car wheel business followed. But Mr. Washburn had previously sold out his interests in these branches of his business and had engaged in the manufacture of steel tires for locomotive wheels and established a foundry at Hartford, Conn. He retired from business some years ago.

THATCHER W. ROOT.

Thatcher W. Root of the Root Publishing Company, Detroit, Mich., died suddenly of heart disease on the 15th inst., at the New Kenmore Hotel, Albany, N. Y., after an illness of but a few hours. He had been in that city in his capacity as a publisher of hardware catalogues, and was completing work with the Albany Hardware & Iron Company, which had occupied him for several months. Mr. Root had always been identified with the hardware business, earlier in life being connected for many years with the Russell & Erwin Mfg. Company, retiring from it to take up the publishing of hardware catalogues and established a company for this special work. He was well and favorably known by the hardware trade throughout the country. Mr. Root leaves one daughter and two sons. His body was taken to Detroit for interment.

NOTES.

JAMES CULLEN, a former partner with Alexander Foster and James G. Carson in the Fairmount Steel Works, Philadelphia, Pa., died September 16 in that city, aged 81 years. He was born in Ballyhackamore, County Down, Ireland, and came to this country when a lad, locating in Norristown, Pa., where he became an iron worker. Later he entered the employ of the Bush Hill Iron Works in Philadelphia. More than 30 years ago he, with the partners named, established the Fairmount Steel Works.

HENRY F. BRUNER of Columbia, Pa., vice-president of the Susquehanna Iron & Steel Company, died September 21 after a brief illness.

FREDERICK S. GIBBS, formerly the New York representative of the Goulds Pump Company, of Seneca Falls, N. Y., died September 21 from aneurism of the heart at Asbury Park, N. J., aged 58 years. Mr. Gibbs was a prominent member of the Republican party in New York State, and had filled many political offices. At the time of his death he was the president of the Metropolitan Water Company.

PERSONAL.

George G. Blackwell of Liverpool, England, sailed on September 19 for Boston on the "Lucania." Mr. Blackwell is chairman of George G. Blackwell Sons & Co., Limited, the well-known dealers in alloys and special metals for high grade steels, ores, &c. He will again visit the iron and steel centers of the United States.

Lawrence Phipps, formerly treasurer of the Carnegie Steel Company, Pittsburgh, Pa., has arrived in this country from Europe.

R. P. Dickson, superintendent of the stock department of the Homestead Steel Works of the Carnegie Steel Company, at Homestead, Pa., has resigned his position. Mr. Dickson has been connected with the Carnegie Steel Company for 22 years, and is a brother of W. B. Dickson, second vice-president of the United States Steel Corporation.

John M. Stetter has been appointed superintendent of the bolt and nut department of the Youngstown Mfg. Company, Youngstown, Ohio. Mr. Stetter was formerly superintendent of the Muncie Works of the Republic Iron & Steel Company, at Muncie, Ind.

Bridge Commissioner Lindenthal of New York has appointed Frederic C. Kunz of Pencoyd, Pa., consulting engineer of the department, to succeed the late C. C. Martin. Mr. Kunz has been connected with the American Bridge Company.

J. K. Davies has severed his connection with the S. Keighley Metal Ceiling & Mfg. Company of Pittsburgh, Pa., with whom he was associated for some time, and will go into the furnishing and equipping of steel ceiling plants. Mr. Davies' experience covers a period of ten years with the Caldwell & Peterson Mfg. Company of Wheeling, W. Va.; the Wheeling Corrugating Company of Wheeling; the Laughlin Nail Company of Martin's Ferry, Ohio, and the S. Keighley Metal Ceiling & Mfg. Company, and he is thoroughly familiar with every detail of the business.

S. W. Prince has been elected secretary and treasurer of the Chicago Pneumatic Tool Company, succeeding John B. Milliken, resigned. The executive committee has been reduced to three, now consisting of C. M. Schwab, C. H. Matthiesson and J. W. Duntley.

E. Parmalee Prentice, member of the law firm of Howland, Murray & Prentice, and a son-in-law of John D. Rockefeller, has been elected a vice-president of the Colorado Fuel & Iron Company, and will have charge of the legal interests.

Miss Alice B. Chute was recently elected assistant manager of the Youngstown Boiler Company, Youngstown, Ohio. To accept her new appointment, she recently resigned her position in the same line of work with the Variety Iron Works, Cleveland, Ohio.

Andrew Carnegie has agreed to give $40,000 for a new branch library in Homewood, Pittsburgh, Pa., if the city will give $6000 annually to maintain it.

Labor Troubles in the Lake Ore Carrying Trade.

CLEVELAND, OHIO, September 22, 1903.—All of the boats of the Pittsburgh Steamship Company, the lake end of the United States Steel Corporation, will be sent to the docks before the middle of October. This is a sudden change in the plans of the company, brought about by a breach between the management of the company and the officers of the American Association of Masters and Pilots. It looks, on the face of it, like a struggle for the recognition of the Masters' and Pilots' Union and the settling of an old score which has been in existence since the opening of the season of navigation. The masters on the lakes were organized only this spring. Therefore there were two organizations, one the American Association of Masters and Pilots and the other the Shipmasters' Association. The latter was comprised of the masters of the larger and the finer ships who were more or less exclusive. They objected to the idea of a union among the masters, saying that the captain was the representative of the owner. The mates on the ships, however, belonged to the American Association of Masters and Pilots and were essential to the masters. There were on the lakes many masters who did not hold positions, either because of a previous disagreement with the owners of the boats they sailed or because younger men were employed. Besides most of the mates have masters' papers and are able to sail boats. These two classes joined in the union and planned to compel the exclusive Shipmasters' Association to affiliate or drive its members out of business. This strong union was being formed when the season of navigation opened. The mates and masters on the lumber carriers had been organized before, and while they were recognized by a contract the American Association of Masters and Pilots could not gain the same recognition. The result is that the American Association of Masters and Pilots claim that they did not get as good terms as the mates on the lumber carriers. This caused some dissatisfaction, at which, however, the members of the American Association of Masters and Pilots could not complain, since they had entered into a contract with the Lake Carriers' Association.

A feeling of discontent has been manifest throughout the year. In addition there was a feeling of dissatisfaction with the Pittsburgh Steamship Company because it was claimed that the classification of boats was not according to the agreement. The situation has been ripe for trouble all the year. An excuse was given the American Association of Masters and Pilots a short time ago, when one of the boats owned by A. B. Wolvin, the general manager of the Pittsburgh Steamship Company, shipped a nonunion mate. This caused the difficulty. The mates and the union masters of the Pittsburgh Steamship Company fleet did not go on a strike, but merely, as their boats entered port, said that they were sick and went home. The boats have been tied to the docks steadily. It has been proposed that the barges which the company own shall be towed behind some of the steamers of other fleets, but the masters on the other boats are said to have refused to handle them. The result is that the Steel Corporation's boats are being tied to the dock as fast as they come in, and the shipment of ore is being wound up, both on lake contract and lake wild boats. The result will be a curtailment of the movement of ore for that company of about 1,250,000 tons. The effect upon the other fleets will be similar, and the season's movement of ore will probably be reduced to 25,000,000 tons, whereas it was hoped to duplicate the shipment of last year, amounting to 27,500,000 tons of ore. It is probable that for the first time in years the entire movement of iron ore will have been completed by October 15.

This reduction in the movement of ore will not seriously injure the iron trade. It is recalled that at the opening of the season of navigation there remained on the lake docks upward of 4,000,000 tons of ore, from the movement of last year. The shipment of 25,000,000 tons this year will give the furnaces in this territory 29,000,000 tons for use during this year. Last season the shipment was 27,500,000 tons. From that a good portion went into Kentucky, Virginia, Pennsylvania and New York, where theretofore the production of ore had been adequate to the needs. Despite this heavy movement the demand in this territory did not amount to within 4,000,000 tons of the movement for the preceding year. Furnaces have been blown in in this territory during the past few months which have a capacity sufficient to consume about 7,000,000 tons of ore in a year. If all of these furnaces should continue active throughout this year they would consume about half a year's supply of ore. But not only are these furnaces likely to be idle a good part of the time, but many of the older furnaces are finding that the lower prices for pig iron and the advanced prices for raw material and labor make it impossible for them to operate at a profit and they are willing to shut down. The result is bound to be a serious curtailment of the consumption of ore, assuring that the present supply, consisting of what was left over and what has been brought down this year, or will hereafter be brought down, will be amply sufficient for all of the needs of the furnaces.

The Masters and Pilots therefore going out on a strike at this time to demonstrate their power, to test the srength of their new organization, as it were, are finding that they have chosen an inopportune time for such a movement, and the general laying up of lake boats is most likely to be one of the serious results of the difficulty now on between the Steel Corporation fleet and the officers of the mates' union.

MANUFACTURING.

Iron and Steel.

The Meehan Boiler & Construction Company, Lowellville, Ohio, builders of steel plate construction, have finished the work of installing new gas producers in the tube mill of the Wheeling Steel & Iron Company, at Wheeling, W. Va., and the producers have been started up.

The Canton Crucible Steel Company, Canton, Ohio, have discontinued the manufacture of steel and will go out of business. The buildings and machinery have been purchased by Cleveland parties.

At the recent annual meeting of the stockholders of the Pope Tin Plate Company, Steubenville, Ohio, the following directors were elected: H. C. Franzheim and George W. Baron, Wheeling, W. Va.; D. J. Sinclair, Steubenville, Ohio; Charles E. Pope, S. V. Huber, John F. Kraft and E. W. Mudge, Pittsburgh.

On September 13 the coal house, engine house, bridge house and stock house of Glen Iron Furnace, at Glen Iron, Union County, Pa., were burned. The company have begun to rebuild.

The Damascus Steel Company will spend $15,000 in enlarging and equipping their plant at New Brighton, Pa., for the manufacture of crucible steel castings. Heretofore the product has been limited to forge steel for tools, &c.

The Dillon-Griswold Wire Company at Sterling, Ill., have decided to increase the output of their wire and nail mills, and to that end are placing contracts for new equipment. A new water turbine will be installed about 1000 feet from the present works, furnishing 500 additional horse-power. The new equipment will be electrically driven, the tools being equipped with individual motors. Twelve Griswold square mesh field fence machines, 2 diamond mesh fence machines, 3 elevators, 2 galvanizing equipments, 8 automatic and 30 single hay bale machines, 42 galvanizing and painted barbed wire machines and 52 nail machines will be installed. Direct water power will be used only for the wire drawing blocks. The transfer to electricity will greatly relieve the present auxiliary steam plant.

The La Belle Iron Works, Steubenville, Ohio, are now operating steadily eight 50-ton open hearth furnaces and the ninth furnace is about ready to start up. Some very excellent records for output have recently been made in this open hearth plant.

The Empire Steel & Iron Company, Catasauqua, Pa., have blown out their Macungie furnace on account of the adverse condition of the iron market.

The Dover Forge & Iron Company, Canal Dover, Ohio, are pushing construction of their new works as fast as possible, and state that their products will be placed on the market for January, 1904, delivery. The output will be hammered iron products, consisting of charcoal iron slabs, blooms and billets, charcoal tin bars, hammered puddled iron blooms and billets, puddled iron sheet bars and muck bar. The range of sizes will consist of slabs and blooms, 100 to 400 pounds each, tin plate and sheet bars 8 x 2 to 8 x ⅜ inch, tested billets 1⅛ to 4 inches gothic, and muck bars all regular sizes. At a recent meeting of the majority stockholders of the Dover Forge & Iron Company

it was decided to annul their West Virginia charter and reorganize under the laws of the State of Ohio as soon as such action can be legally accomplished.

Work was resumed September 14 at the mills of the Buffalo Steel Company, Tonawanda, N. Y., after the annual shut down of about six weeks, during which time some necessary repairs were made. A new continuous furnace and automatic cooling beds were installed, together with additional machinery which will give them a greater output. The company manufacture Bessemer bar steel, angles, channels, tees, special shapes for agricultural implements and light mine rails.

While awaiting the completion of the rebuilding of the rod mill at Anderson, Ind., the American Steel & Wire Company are sending rods by fast freight from their Cleveland, Ohio, rod mill to the wire and nail mills at Anderson in an effort to keep up with the great demand for wire and nails. The improvements made in the Anderson plant the last two months cost $150,000. The company employ 800 men there.

The National Rolling Mill, Hartford City, Ind., is idle. A boiler tube burst in the 10-inch mill and the muck mill is shut down on account of inability to obtain common labor. The Italian colony deserted and returned to Chicago when they learned that the mill was going to Vincennes.

The American Rolling Mill Corporation have resumed operations in all departments of their Muncie, Ind., mill after an extended shut down for repairs.

The Eleanor Iron & Steel Company, whose plant was formerly located at Irwin, Pa., turning out merchant iron and skelp, have secured a large tract of land at East Butler, Pa., and are erecting two 40-ton open hearth steel furnaces, a 30-inch blooming mill and sheet bar mill thereon. The company will manufacture billets and sheet bars and expect to have the new plant in operation shortly after the first of the year. John Robinsteen of Pittsburgh is president, and B. F. Porter is secretary of the company.

The Pittsburgh Steel Foundry of Pittsburgh, operating a large furnace at Glassport, Pa., will in the future give their employees a half holiday every Saturday, with full pay.

Dover Furnace, at Carlisle, Tenn., operated by the Dover Iron Company of Bear Spring, was destroyed by fire September 3. The engine house and most of the machinery was saved. Dover Furnace was originally built in 1828, abandoned 1834, rebuilt in 1854 and again repaired in 1873. After standing idle for 30 years, it was again rebuilt in 1903 by the present owners and has been in blast about seven months. The stack will undoubtedly be rebuilt and operated again in the near future.

General Machinery.

Considerable mechanical equipment will be required this coming winter by the Syphers Machinery Company of Spokane, Wash., who are erecting buildings for the manufacture of special machines for use in cereal mills, saw mill outfits, edgers, trimmers, &c. In the spring a machine shop and foundry will also be erected. Jno. Syphers, general manager, informs us that the wood working machinery has been purchased.

The following tools have been purchased by the Gas Machinery Company of Cleveland for their new shop, 80 x 100 feet, to be erected in Collingwood, Ohio.: 42-inch by 12-foot open side planer, 30 x 30 inch by 8 foot planer, 24-inch shaper, 42-inch vertical boring and turning mill, horizontal drilling and boring machine, universal radial drill, 24-inch lathe, 12-foot bed; 16-inch lathe, 8-foot bed: cold metal saw, wet tool grinder, &c. The company do not intend buying any additional equipment at present, but will be in the market for other material in the near future.

It has not yet been ascertained just what new machinery A. M. Byers & Co. of Pittsburgh will have to purchase to replace that destroyed in the fire at their plant September 6. The fire was confined to the socket department and machine shop, and it is thought that most of the machinery and tools are not damaged beyond repair. The building is now being replaced by a more substantial structure. With the exception of these two departments the working of the balance of the plant was only slightly interfered with. The company manufacture wrought iron pipe.

The Coshocton Machine Company, Coshocton, Ohio, have leased ground and will erect a two-story frame building 34 x 120 feet. The company were incorporated in December last, and their business has grown very rapidly, necessitating larger quarters.

A number of machines for the wood working department, trimming department and blacksmith shop, several electric motors and an engine of about 200 horse-power are required by the Winona Carriage Company, Winona, Minn., for their proposed new plant. The list of machinery will not be ready probably for some little time yet. The company have purchased a 10-acre site upon which there are several buildings and which they will occupy. These consist of a building 65 x 87 feet, two stories, which will be used as the wood working department; another, 64 x 149 feet, two stories, which will be used as a storehouse; engine and boiler house, equipped with three large boilers, hot water heater and a small dynamo. Directly across the street from the boiler house the company are erecting a factory building 62 x 200 feet, three stories, which will be equipped with modern machinery which will be operated by independent motors. They hope to be settled in their new quarters early in January.

Stockholders of the Landis Tool Company of Waynesboro, Pa., have subscribed for the total $30,000 paid up stock of a new company who will manufacture and sell a patent bolt cutting machine, the invention of A. B. Landis. The company will elect directors and officers this month and will at once apply for a charter. The authorized capital will be $50,000, $30,000 of which will be paid up. The plant of the defunct Smith Mfg. Company will be used and work will be started November 1.

J. L. Osgood, dealer in machinery and tools, Buffalo, N. Y., has opened a salesroom for the tools made by the Morse Twist Drill & Machinery Company, at 121 and 131 Erie County Bank Building, that city, where he will carry a complete stock of Morse drills, taps, reamers, cutters and small tools, for which there is an increasing local demand, owing to the many new industries in iron and steel recently established in Buffalo and vicinity.

The Hinkle Iron Company, 534-538 West Fifty-sixth street, New York, are to build an addition to their plant, which will be fitted up as a rigging loft. It is expected that the company will purchase a few small machines for installation in the new shop.

Much of the equipment in the plant of the Westinghouse Machine Company of the South Side, Pittsburgh, which has been abandoned, has been bought by the Chambersburg Engineering Company, at Chambersburg, Pa.

The additions to the plant of the National Drill & Mfg. Company, Barberton, Ohio, now under construction, consist of a warehouse and erecting shop, 80 x 225 feet; forge shop extension, 60 x 225 feet, and paint shop, 40 x 100 feet. Orders for a large amount of wood and iron working machinery have already been placed, and the company are not now in the market for any additional mechanical equipment.

Power Plant Equipment.

The Ball Engine Company of Erie, Pa., are installing three 400 horse-power vertical cross compound direct connected engines in the new Oliver office building being erected on Wood street, Pittsburgh. The company have just received an order for an additional 700 horse-power vertical cross compound Corliss direct connected engine for the same building. This will make one of the largest isolated plants in Pittsburgh.

The United States Department of Agriculture have recently given contract for furnishing the boilers required at the Government syrup station at Waycross, Ga., to the J. S. Schofield's Sons Company, Macon, Ga.

The Litchfield Engine & Machine Company have incorporated with headquarters at Litchfield, Ill. Frank R. Milnor, first vice-president of the Litchfield Bank & Trust Company, is interested.

It is stated that the Village Board, Shelton, Neb., are receiving bids until October 1 for new municipal works, to consist of stand pipe, 25 horse-power gasoline engine, 8½ x 8 inch triplex pump, mains, hydrants, &c. H. L. Wellston, 3857 Charles street, Omaha, Neb., is designing engineer.

Bids are asked until October 8 by the Board of Trustees, Onarga, Ill., for the construction of water works, to include brick water tower, 16 x 70 feet, and foundation, surmounted by steel tank 16 x 32 feet; pump house, 16 x 20 feet; triplex pump with capacity of 240 gallons per minute; gasoline engine, 10 to 12 horse-power; three 4-inch wells, about 150 feet deep; 650 feet of 6-inch water pipe and specials.

The Newton Water Works, Newton, Iowa, will receive bids until September 28 for the construction of water works, including pumping station, two compound pumping engines with a combined daily capacity of 1,000,000 gallons, low service pumping engine, two tubular boilers, 16 inches by 16 feet, cast iron pipe, &c.

Capitalists of Detroit and Wyandotte, Mich., are organizing a company with $300,000 capital stock for the development of the water power of the Huron River. It is understood that a good sized electric plant is to be installed and that a contract has been made to furnish power to operate the new Detroit & Toledo Shore Line Railroad. M. R. Bacon of the Michigan Alkali Company, Detroit, is one of the promoters of the enterprise.

The Alama Mfg. Company, Hillsdale, Mich., have increased their capital stock from $150,000 to $200,000. The company make gas and gasoline engines.

The Spencer Electric Light & Power Company will install an electric light plant at Belding, Mich.

The Fitchburg Steam Engine Company of Fitchburg, Mass., report the following contracts: Three 300 horse-power and one 125 horse-power, for Hotel Belmont, New York; 150 horse-

power, for Curtis & Bros., Newark, N. J.; 100 horse-power, for Coates Clipper Company, Worcester, Mass.; 500 horse-power cross compound, for Woronoc Street Railway Company, Westfield, Mass.; 500 horse-power tandem compound, for Morse, Williams & Co., Philadelphia: 450 horse-power tandem compound and 120 horse-power, for Philadelphia Watch Case Company, Philadelphia; two 150 horse-power, for Centralia Gas & Electric Company, Centralia, Ill.; 200 horse-power, for Richard Muller, New York: 100 horse-power, for Brattleboro, Vt., Street Railway Company: 120 horse-power, for Stickney, Tirrell & Co., Boston; two 175 horse-power tandem compound, for Pacific Electric Railway Company, Los Angeles, Cal.; 200 horse-power, for Cuban Sugar Refinery Company, Cuba: 100 horse-power, for Edwin Harrington, Sons & Co., Philadelphia; 100 horse-power, for Henry Disston & Co., Philadelphia.

Chas. McCulloch, Henry Beadell, J. H. Rahe, Jos. F. Getz, A. Fuelber, Paul E. Wolf, C. Bayer and W. P. Gross have made a proposition to the city of Fort Wayne, Ind., to build it an electric light plant. Under the conditions the plant would become the property of the city in ten years on the payment to the company of $60,000 which has been raised by taxation for a municipal plant.

An engine of about 200 horse-power is required by the Winona Carriage Company, Winona, Minn. *See General Machinery.*

The Murray Iron Works, Burlington, Iowa, report the booking of an order for a 16 x 36 inch engine, 225 horse-power, of their new rolling mill type for the Illinois Sewing Machine Company, Rockford, Ill. The engine will be used to drive an electric generator for lighting and power purposes at the sewing machine company's plant.

The Saunders Smoke Consumer Company have been incorporated at Buffalo, N. Y., with a capitalization of $25,000, to manufacture smoke consumers. The directors are John H. Saunders, Frank N. Carpenter, D. A. Minard, John Gann and Wm. Mehrof, all of Buffalo.

The Marietta Boiler Company, Marietta, Ohio, are considering the advisability of removing their plant to East Butler, Pa.

Foundries.

The new foundry of the Standard Engineering Company, at Ellwood City, Pa., is almost completed. A 50-ton Niles crane is already in place and is facilitating the handling of material used in the erection of the plant.

Flum Brothers have recently completed the erection of a new foundry plant at East High and Eleventh streets, Hamilton, Ohio, the principal product of which will be gray iron castings. The main molding floor is 60 x 108 feet, with a two-story structure on High street 48 x 60 feet. The new plant ran off its first heat August 1 and is now employing some 30 molders. The Flum Brothers were formerly identified with the Vulcan Foundry Company of the same city.

The Enterprise Foundry Company, Muskegon, Mich., have let contracts for the erection of a foundry addition 50 x 70 feet, and an office building 20 x 24 feet.

The Weaver-Hirsh Foundry, Allentown, Pa., has been sold to the trustee for the bondholders for $25, subject to a mortgage of $69,000.

Bridges and Buildings.

The Topeka Bridge Company will move their plant from Elizabeth, Ill., to Topeka, Kan., where the two plants are to be consolidated. The company have a number of contracts on hand and will probably incorporate with increased capital stock and enlarge their works. The business is under the management of George Skene.

The Western Steel Company, Des Moines, Iowa, have been incorporated by Fremont Turner with a capital stock of $10,000, to build water works. Several contracts have already been secured by the new company. The purposes of incorporation also include the constructing and operating of light and power plants, the constructing of buildings, bridges and other structural iron and steel work.

Fires.

The steel works of Francis Smith & Co., San Francisco, Cal., were destroyed by fire September 17, entailing a loss of $60,000.

No. 2 coal tipple at Monongah, W. Va., and adjoining buildings, including machinery, owned by the Fairmount Coal Company, were destroyed by fire September 18. The loss is placed at $100,000.

The Union Railway Company's power house at New Rochelle, N. Y., was burned September 19. Considerable machinery was badly damaged.

The Hammond Iron Works, Warren, Pa., were destroyed by fire September 21, entailing a loss of about $75,000 and throwing 200 men out of employment. The buildings were equipped with costly machinery.

Miscellaneous.

The Central Iron & Metal Company, Chicago, have been incorporated with a capital stock of $15,000 to deal in iron and metals. The company have purchased of B. Horwich a plant at Halsted and Twenty-sixth streets, formerly owned by the National Iron & Metal Company. The incorporators are Bernhard Horwich, E. N. Seoline and Samuel Horwich.

The Gregg Company, Limited, Newburgh, N. Y., who were recently incorporated, are erecting a plant for the manufacture of cane field appliances, including Gregg patent sugar cane cars, portable track, cane car unloaders, &c. William C. Gregg is president, J. A. Tuthill vice-president, and C. E. Stafford secretary and treasurer.

The Miami Mfg. & Plating Company, Hamilton, Ohio, are now occupying the large two-story brick structure formerly used by Ritchie & Co., Hamilton Gas Engine Works, on the canal. The company have been installing a brass casting department and are putting in two additional furnaces. They are also putting up an addition of 30 x 40 feet for the production of all kinds of brass work and in addition a general brass, copper and nickel plating business will be conducted. The company are fully equipped to do machine work and undertake the entire production of specialties.

The Riter-Conley Mfg. Company of Pittsburgh, with works in Allegheny and Leetsdale, Pa., and builders of heavy plate iron construction work, have been awarded a contract for building 12,000 feet of 50-inch riveted pipe for the Mexican Light & Power Company, Limited, of Hexaca, Mexico. The contract will require about 1800 tons of plates.

Two recent and important contracts by the Union Switch & Signal Company are those for the Interborough Rapid Transit Company (Subway) of New York, and the North Shore Railway of California The Westinghouse Electro-Pneumatic system is to be installed on the first named, but a new feature is to be introduced, that of using alternating current. It is obvious that the use of track circuits on third-rail roads, where the rails are used for the return circuit, and at the same time for the signaling circuit, introduces what may be serious complications. In order to avoid these difficulties the signals will be controlled by alternating current, through relays that are sensitive to alternating current only, and which will not be affected by the direct current used for train service in the subway. On the North Shore Railway, which runs about 30 miles north from Sausalito, Cal., across the bay from San Francisco, the electric semaphore system of automatic block signals is to be used with a track circuit. This being a high tension third-rail electric road, alternating current will be used for the signal system.

The McCallum Steel Wagon Company of Plymouth, Ind., have been incorporated with $225,000 capital to manufacture and sell McCallum steel wagons, agricultural implements and to do iron and coal mining. James McCallum is president.

McKenna Brothers Brass Company, Limited, of Pittsburgh, manufacturers of brass goods of all kinds, have been dissolved by mutual consent, and the business will be continued in the future by the McKenna Brothers Brass Company, a corporation.

The Westinghouse Electric & Mfg. Company are said to have 20 per cent. more orders on their books now than at this time last year, and to have sufficient business booked to keep the plans busy practically through all of 1904.

Delaware River Steel Casting Company.

The Delaware River Steel Casting Company, organized a few months ago under the laws of Delaware, have purchased from the Faron Estate a tract of land in Chester, Pa., situated between Morton and Reaney streets, facing the Delaware River. Upon this site the company will shortly begin the construction of a plant the contract for the main building of which has been let to the McClintic-Marshall Construction Company of Pittsburgh, Pa. The Alfred Box Company of Philadelphia, Pa., secured the order for the cranes. About $500,000 in stock and $300,000 of first mortgage sinking fund gold bonds are to be issued, and it is understood that arrangements have been made for placing about one-third of the bonds. Major E. H. Goodman, who for many years was connected with the Pullman Palace Car Company, in the official capacity of vice-president, and until this time has been vice-president of the Union Switch & Signal Company of Pittsburgh, has accepted the position as president of the new company. William S. Logan of Chester is vice-president and general manager. J. Parker Crittenden, attorney of Philadelphia, is treasurer. Edward J. Altemus, for many years connected with the Neafie & Levy Ship & Engine Building Company, is secretary. The Board of Directors is composed of the following: E. H. Goodman, William S. Logan, Arthur Bruce, Edward J. Altemus and Ralph C. Lupton.

In experiments made with an electric car on the Marienfelder military railroad at Berlin, Germany, on September 17, a speed of 106 miles an hour was attained. It is hoped that eventually the cars will attain a speed of 200 miles an hour.

The Iron and Metal Trades.

If the movement inaugurated by furnacemen, both East and West, within the past week, brings about the restriction of production expected, a change will undoubtedly be felt in the Pig Iron trade, which has thus far been the weakest branch of the Iron and Steel business. A meeting of the furnace owners of the Mahoning and Shenango valleys was held in Pittsburgh on Saturday, and another meeting of Eastern Pennsylvania and New Jersey furnace owners was held in New York on Tuesday. The common object of these meetings, although they were not held in collusion, was to determine whether some action could not be taken to check the downward movement of prices. While no agreement was made with regard to prices, it was decided that restriction of production was necessary. No definite plan was announced, but it is understood that as soon as possible a number of furnaces are to be blown out. It was found on interchanging views that few Northern furnace companies are now in a position to manufacture Pig Iron at a profit. It would certainly be bad business policy to pile much Pig Iron produced at present cost. It is expected that other meetings will be held this week, both in the East and the West, at which other furnace owners will be expected to be in attendance and the movement toward restricting production will be widened.

Action of this kind is imperative, as the consumption of Pig Iron is being reduced from week to week. The continuous lowering of prices causes buyers to hold off and checks business all along the line.

The lessened demand for finished products is shown by the closing of some important establishments during the past week. The outlook for the future in the structural trade is exceedingly bright, it being stated by leading manufacturers, who have made a thorough canvass of the situation, that, after eliminating all doubtful projects, the work in sight aggregates 200,000 tons more than at the corresponding time a year ago. Still, mills cannot be run on prospects, and meanwhile some of the structural works are being closed to await the placing of further orders in this line.

The manufacturers constituting the Billet Association met in this city on last Thursday and, contrary to general expectation, decided to maintain prices on the basis previously established. It was their judgment that no benefit would result from any reduction in prices at this time, notwithstanding the lower rates being named by outside manufacturers.

It is refreshing in the midst of unsatisfactory trade reports to learn that the Wire trade is in phenomenally good condition. The actual business placed for immediate shipments of Wire and Wire Products thus far this month is the largest in three years.

Labor troubles among vesselmen on the lakes will curtail the movement of Iron Ore from the mines to lower lake ports, and may cause the indefinite closing of important mining operations in the Lake Superior district. This will not affect the operations of furnaces, however, as the Ore supply under any conditions will be ample for the coming winter.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Sept.23, 1903.	Sept.16, 1903.	Aug.26, 1903.	Sept.24, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$15.75*	$16.00	$16.75	$22.00
Foundry Pig No. 2, Southern, Cincinnati	*14.75*	14.75	15.00	22.25
Foundry Pig No. 2, Local, Chicago	*15.75*	16.00	16.50	23.00
Bessemer Pig, Pittsburgh	*16.85*	17.35	17.85	21.75
Gray Forge, Pittsburgh	*14.50*	15.50	16.00	20.75
Lake Superior Charcoal, Chicago	19.00	19.00	19.00	26.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	27.00	27.00	27.00	29.00
Steel Billets, Philadelphia	27.50	28.00	28.00	27.00
Steel Billets, Chicago	28.00	28.00	28.00	29.50
Wire Rods, Pittsburgh	*34.50*	34.50	35.00	35.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*14.50*	14.50	16.50	19.00
O. Steel Rails, Philadelphia	*15.50*	16.00	16.75	21.50
O. Iron Rails, Chicago	*17.00*	18.00	18.50	25.00
O. Iron Rails, Philadelphia	*18.00*	19.00	19.00	25.00
O. Car Wheels, Chicago	*18.00*	21.00	21.00	21.00
O. Car Wheels, Philadelphia	*17.00*	18.00	19.00	20.00
Heavy Steel Scrap, Pittsburgh	*16.00*	16.50	17.00	....
Heavy Steel Scrap, Chicago	*13.00*	14.00	14.50	18.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.60	1.60	1.60	1.92
Common Iron Bars, Chicago	*1.50*	1.55	1.55	1.85
Common Iron Bars, Pittsburgh	*1.55*	1.60	1.60	1.80
Steel Bars, Tidewater	1.73½	1.73½	1.70	2.00
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater	1.78	1.78	1.78	2.00
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.75
Beams, Tidewater	1.73½	1.73½	1.73½	Nom.
Beams, Pittsburgh	1.60	1.60	1.60	Nom.
Angles, Tidewater	1.73½	1.73½	1.73½	Nom.
Angles, Pittsburgh	1.60	1.60	1.60	Nom.
Skelp, Grooved Iron, Pittsburgh	*1.60*	1.80	1.80	2.02½
Skelp, Sheared Iron, Pittsburgh	*1.70*	1.85	1.85	2.10
Sheets, No. 27, Pittsburgh	*2.55*	2.55	2.60	2.85
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.85
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	2.00
Cut Nails, f.o.b. Pittsburgh	2.15	2.15	2.15	2.05
METALS:				
Copper, New York	*13.50*	13.50	13.75	11.60
Spelter, St. Louis	**5.75**	5.65	5.60	5.25
Lead, New York	**4.40**	4.40	4.12½	4.10
Lead, St. Louis	**4.40**	4.45	4.15	3.97½
Tin, New York	*26.75*	27.40	27.70	25.80
Antimony, Hallett, New York	*6.25*	6.25	6.37½	7.75
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.99	3.99	3.99	4.19

Chicago.

FISHER BUILDING, September 23, 1903.—(*By Telegraph.*)

The volume of business in both Iron and Steel during the week has been light, as most consumers are buying only for current requirements, there being nothing to stimulate covering of future needs. Weakness continues to be exhibited in a few lines of finished material, but it is remarkable how well prices are maintained in other lines. Pig Iron, however, has been exceptionally weak, sales being made from 25c. to 50c. per ton lower than a week ago. The policy of making $11 for No. 2 Foundry, Birmingham, for Eastern shipments, while holding the market in this territory at the same price, is largely responsible for curtailment in business. Buyers are now demanding to be placed on the same basis as Eastern consumers, and their demands have been granted to a considerable extent. There has been more activity in Bar Iron, but at the further expense of prices, the heavy drop in Scrap and the lower prices prevailing for Pig permitting lower prices for Finished Bars. There has been a moderate movement in Soft Steel Bars, but official prices have been well sustained, the policy of guaranteeing against decline being continued, but without attracting much business. A number of the mills short on contracts for Bars are making a strong effort for Light Rails, and the keen competition, resulting in lower prices, is attracting considerable attention. Standard Rails, however, are firm. Sheets have continued irregular, and Plates, while steady, have been quiet. Merchant Steel has continued moderately active, and there has been a better demand for Merchant Pipe and Boiler Tubes, but Cast Iron Pipe has been dull and heavy. Malleable Fittings have been reduced from 15 to 18 per cent. The remarkable feature of the week has been the break in the Scrap market. Copper and Spelter have been easier

and Lead stronger, and some little improvement in the demand for Coke has been experienced.

Pig Iron.—The confirmation of the report that the Southern Association has made a price of $11 for No. 2 Birmingham for the Eastern territory without changing the basis for the Western section has discouraged large purchases in the Chicago territory, except at a material decline. Buyers show a radical change in their opinion of the situation, some going to the extreme of predicting $9 for No. 2 Birmingham during the current year. It is within conservative limits to say that the action of the Southern Association seems to have demoralized the market for Foundry grades. Early in the week there were some considerable sales made on the basis of $11.75 for No. 2 Foundry, at Birmingham, but there has since been a drop of 25c. to 50c. a ton, with the probability that this market will reach the $11 limit within a day of two, if it has not already done so. Independent furnaces have been selling a few 100-ton lots quite freely on the basis of $11.50 for No. 2, and large buyers have purchased on the basis of $11.25, Birmingham, but there has scarcely been an individual sale larger than 600 tons, and in the aggregate the tonnage is not large. Nearly all the buying has been of a hand to mouth character, melters making little endeavor to cover their wants beyond 30 to 60 days, and most of them for a shorter period. Northern Iron has sagged in sympathy with the weakness in the Southern production, but is relatively better maintained. Bessemer Iron, both Malleable and Standard, has been easier, with less inquiry. Pipe works have been among the larger consumers in the market during the week, having purchased about 900 tons of Nos. 3 and 4 Foundry, Gray Forge and Mottled, on the basis of $11.25 for No. 2 Foundry. Several hundred tons of No. 2 Foundry also have been sold at $11.25, 400 tons at $11.50, and 600 tons early in the week at $11.75, Birmingham. A considerable portion of the trading, however, has been in "off" grades, which furnaces have been anxious to dispose of at very low prices, one lot of 600 tons of White Mottled and other low grades having been sold at $12, delivered, Chicago. About 400 tons of Ohio Silvery Iron, 8 to 10 per cent., has been sold on the basis of $19 at the furnace. Small lots of both Malleable and Standard Bessemer have been sold at $17, but buyers are demanding concessions at the close. The above are typical sales, without an attempt to give an idea of the tonnage being disposed of. The following are the approximate prices current, f.o.b. cars, Chicago, either for quick shipment or long delivery:

Lake Superior Charcoal	$19.00 to $20.00
Northern Coke Foundry, No. 1	16.50 to 17.00
Northern Coke Foundry, No. 2	15.75 to 16.25
Northern Coke Foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	17.00 to 17.50
Ohio Strong Softeners, No. 1	17.50 to 18.00
Ohio Strong Softeners, No. 2	17.30 to 17.50
Southern Silvery, according to Silicon	17.10 to 18.10
Southern Coke, No. 1	16.10 to 16.35
Southern Coke, No. 2	15.35 to 15.85
Southern Coke, No. 3	14.85 to 15.35
Southern Coke, No. 1 Soft	16.10 to 16.35
Southern Coke, No. 2 Soft	15.35 to 15.85
Foundry Forge	14.35 to 14.85
Southern Gray Forge	13.85 to 14.35
Southern Mottled	13.35 to 13.85
Southern Charcoal Softeners, according to Silicon	18.85 to 19.85
Alabama and Georgia Car Wheel	25.35 to 26.35
Malleable Bessemer	16.75 to 17.00
Standard Bessemer	17.00 to 17.25
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	19.30 to 21.30

Bars.—There has been an increased demand for Bar Iron, larger purchases being made by railroads and car shops on the basis of 1.50c. to 1.55c., Chicago, among the sales being one lot of 750 and one lot of 600 tons for delivery during the remainder of the year. The large sales have been to cover contracts for railroad cars recently placed. Jobbers report that they find the mills ready to sell for quick shipment on basis of present prices, but are discouraging the placing of contracts for long delivery on this basis. Soft Steel Bars have changed but little, if any, during the week, although some mills have received a number of specifications on old contracts, while a few new lots of from 500 to 600 tons each, aggregating about 2000 tons, have been placed for long delivery. The guarantee against decline has resulted in bringing but little new business forward, and as the largest buyers are pretty well covered there seems to be little inducement for freer purchasing for future requirements. There is a determination, however, to maintain prices, no weakness being apparent on the part of producers. The following are the prices current, f.o.b. cars, Chicago, mill shipment: Bar Iron, 1.50c. to 1.60c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.06½c. to 2.16½c.; Bessemer Bands, 1.76½c. to 1.86½c.; Angles, under 3 inches, 1.86½c. to 1.91½c., base. The demand for shipment from local stocks has been moderate and readily met at previous prices, Iron Bars selling at 1.90c. in carload lots, and 2c. to 2.10c. in less than carload lots. Soft Steel Bars sell at 2c. rates; Angles, under 3 inches, 2.10c. rates, and Hoops, 2.40c., base, from store.

Structural Material.—Beyond the placing of a few small contracts for railroad and highway bridges the market has been quiet. There are a few contracts for local buildings still to be placed, but all told they would scarcely figure 5000 tons. The shops making bridge material are well supplied with orders for several months to come, while other Structural mills are hungry for orders. There is no disposition, however, to change prices, as the lower prices would not bring any more business at the present time. The tone of the market is steady, the following being the prices for mill shipments, Chicago: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. There has been a moderate demand for shipment from local stocks, and prices have been well sustained as follows: Beams and Channels, 2.10c. to 2.25c.; Angles, 2.10c. to 2.25c.; Tees, 2.15c. to 2.30c., from local yards.

Plates.—Specifications on contracts previously placed have been received in ample amount to keep the mills in this section running, and there seems to be more business in sight through the placing of orders for railway cars. The tone of the market continues steady, prices being well maintained, f.o.b. cars, Chicago, mill shipment, as follows: Tank Steel, ¼ inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.15c.; Marine, 1.95c. to 2.10c. There has been a moderate demand for shipment from local stocks, and the market has continued steady at the following prices: Steel, ¼ inch and heavier, 2c. to 2.15c.; Tank Steel, 3-16 inch, 2.10c. to 2.25c.; No. 8, 2.15c. to 2.30c.; No. 10, 2.30c. to 2.40c.; Flange Steel, 2.250c. to 2.40c., all f.o.b warehouse, Chicago.

Sheets.—There has been little, if any, improvement noted in the market for Black Sheets. There is quite active inquiry, resulting in some sales of moment, most of which, however, have been closed on a lower basis than quotations. The market continues irregular and it is difficult to make accurate quotations, but small sales are made on the basis of the following quotations, f.o.b. cars, Chicago, for mill shipment: No. 10, 1.96½c. to 2.06½c.; No. 12, 2.06½c. to 2.16½c.; No. 14, 2.16½c. to 2.26½c.; No. 16, 2.26½c. to 2.36½c.; Nos. 18 and 20, 2.41½c. to 2.51½c.; Nos. 22 and 24, 2.51½c. to 2.61½c.; No. 26, 2.61½c. to 2.71½c.; No. 27, 2.71½c. to 2.81½c.; No. 28, 2.81½c. to 2.91½c. Small lots for shipment from local stocks are sold at from 10c. to 15c. over mill prices. Galvanized Sheets have been less active and easier, sales being made at 75, 10 and 2½ to 75, 10 and 5 discount, mill shipment. Small lots from local store sell at 75 and 2½ to 75 and 5 discount.

Cast Iron Pipe.—There has been but little, if any, improvement in the market, sales being confined to small lots of Pipe for renewals by gas and water companies; but railroads are also buying moderate amounts. Lower prices prevail for round lots, but for small orders the following are the prices current, f.o.b. cars, Chicago: 4-inch, $30; 6-inch and larger, $29, in carload lots, for Water, and $1 per ton higher for Gas Pipe.

Billets.—Little inquiry has been experienced for Bessemer Rerolling Billets in this market and prices have remained nominally unchanged at $28, while Open Hearth Billets have been sold at $28 to $29 to a moderate extent. Open Hearth Forging Billets have been sold at $31.50 to $32 in carload lots, at and near Chicago. Considerable activity is reported in the East, but at the expense of prices.

Wire Rods.—Sales of 15,000 tons of Wire Rods are reported on the basis of $35, Pittsburgh, there being a fair inquiry for delivery in this section.

Merchant Pipe.—An increased volume of business was taken during the past week for current shipment and the market remains firm as previously quoted, transactions being on the basis of the following schedule of discounts, in carload lots, random lengths, mill shipment:

	Steel Pipe.		Guaranteed Wrought Iron	
	Black. Per cent.	Galvd. Per cent.	Black. Per cent.	Galvd. Per cent.
⅛ to ⅜ inch	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—The mills are still well supplied with orders and the market remains steady at the following schedule of discounts, mill shipment, f.o.b. cars, Chicago:

	Steel.	Iron.
1 to 1½ inches	40	35
1¾ to 2½ inches	55.85	35.85
2¾ to 5 inches	60.85	45.85
6 inches and larger	55.85	35.85

Less than carloads, 12½ per cent. advance.

A fair demand for shipment from local stocks has been experienced during the week by local distributers and the market has remained steady at the following schedule of discounts from warehouses, Chicago:

	Steel.	Iron.
1 to 1½ inches	40	35
1¾ to 2½ inches	50	32½
2¾ to 5 inches	57½	42½
6 inches and larger	50	..

Merchant Steel.—There has continued to be a fair inquiry for small amounts of agricultural specialties, but

there has been less demand for Shafting and only moderate inquiry for Tool Steel, without change in the general conditions. The following are the official prices, f.o.b. cars, Chicago, mill shipment: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½ c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 8c. for mill shipment; Specials, 12c. upward. Cold Rolled Shafting in carload lots sells at 47 and in less than carload lots at 42 discount from list.

Rails and Track Supplies.—There has been a moderate demand for Standard Rails for quick shipment in lots of 50 to 100 tons, and one sale of 2000 tons for delivery during the remainder of the year. The scarcity of orders for Soft Steel Bars has resulted in more active competition for Light Rails, mainly in the Eastern territory. An increased number of sales have been made to electric roads for shipment during the calendar year. Prices remain steady at $28 for Standard and $27 for second quality, mill shipment. Light Rails have sold at $28 to $34 for 30 and 12 lbs., and differentials for intermediate sizes. Track Supplies have been fairly active and steady at the following prices: Splice or Angle Bars, 2c. to 2.10c.; Spikes, 2.10c. to 2.10c.; Track Bolts, 3½ to 3¾ inches and larger, with Square Nuts, 2.85c. to 2.90c.; with Hexagon Nuts, 3c. to 3.10c. From store 10c. to 15c. over mill prices are asked and obtained.

Old Material.—With another break in the price of Pig Iron, Scrap has been more freely offered, and the market is weaker, with the tendency of prices still downward and both furnaces and mills buying only to meet current requirements. Heavy Relaying Rails continue to be depressed, with a further sharp break in prices. A week ago 700 tons sold on the basis of $24.50, Chicago, but to-day the are difficult to sell at over $21, and sales are reported at this price at Cincinnati. Old Car Wheels, too, have been more freely offered and have dropped very heavily. In fact, there is pressure to sell almost all kinds of Scrap, 1000 tons of No. 1 Railroad Wrought selling at $14, and at the close it would be difficult to obtain even this price. Prices are revised, the following being the current quotations per gross ton, f.o.b. cars, Chicago:

Old Iron Rails	$17.00 to $18.00
Old Steel Rails, mixed lengths	14.50 to 15.00
Old Steel Rails, long lengths	15.50 to 16.50
Heavy Relaying Rails	21.00 to 22.00
Old Car Wheels	18.00 to 18.50
Heavy Melting Steel Scrap	13.00 to 14.00
Mixed Steel	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates	$14.50 to $15.00
Iron Car Axles	19.00 to 19.50
Steel Car Axles	16.50 to 17.00
No. 1 Railroad Wrought	13.50 to 14.00
No. 2 Railroad Wrought	12.50 to 13.00
Shafting	16.00 to 16.50
No. 1 Dealers' Forge	11.50 to 12.00
No. 1 Busheling and Wrought Pipe	10.00 to 10.75
Iron Axle Turnings	9.50 to 10.50
Soft Steel Axle Turnings	9.50 to 10.00
Machine Shop Turnings	9.50 to 10.00
Cast Borings	5.50 to 6.00
Mixed Borings, &c	5.50 to 6.00
No. 1 Boilers, cut	11.50 to 12.00
Heavy Cast Scrap	11.50 to 12.00
Stove Plate and Light Cast Scrap	9.50 to 10.00
Railroad Malleable	13.00 to 13.50
Agricultural Malleable	12.00 to 12.50

Metals.—Further weakness has been developed in the Copper market, with little, if any, increase in buying, and, in fact, the close is dull, with Casting Copper difficult to sell at 13¼c. and Lake selling at 13½c. in carload lots. Spelter has been more freely offered, with a fair demand, at 5.60c. for spot and September and 5.55c. for October delivery. Lead continues strong, the largest companies being sold ahead for 30 to 60 days, and it is difficult to obtain supplies even at the advanced prices. The nominal quotations are 4.35c. for 50-ton lots and 4.37½c. in carload lots. Old Metals have been more freely offered and are weaker, with prices lower. Heavy Cut Copper is held at 12⅛c., Copper Bottoms at 11c., Red Brass at 11⅛c. Lead Pipe is strong at 4c. and Zinc is easier at 4½c., spot.

Coke.—A more active demand has been experienced for Furnace Coke, with some increase in the sales for long delivery, but Furnace fuel, while in better demand, is selling only for quick shipment. Among the sales have been 20,000 tons of Standard Furnace Coke, at $2.15 at the ovens, for delivery during the remainder of the year. Connellsville, Pocahontas and New River 72-hour Foundry Coke is selling at $2.75 to $3.25, and Furnace Coke at $1.90 to $2.15, at the ovens; freight, Chicago, $2.65.

The Pittsburgh Steel Company of Pittsburgh, Pa., operating rod and wire mills at Monessen, Pa., have taken over the holdings of the Iron City Coal Company, which assures to the Pittsburgh Steel Company a large supply of coal for many years to come.

Philadelphia.

FORREST BUILDING, September 22, 1903.

The past week has not developed favorably as regards the Iron and Steel situation. There has been more inquiry and more sales have been made, but the tonnage is disappointing, as none of the orders were for large lots. It is not a pleasant thing to record, but it is a fact that the feeling is less hopeful than it has been for a long time past. Deliveries have been peremptorily held up by some of the largest concerns in the district, and with this Iron to be resold, it is feared that the pressure will be considerably increased, as new markets have to be found most unexpectedly. Against this, one leading producing interest announce that $16 at furnace—equal to $16.75 for No. 2 X Foundry, delivered at nearby points—will be their minimum figure, and if that cannot be obtained, they will go out of blast. Others, however, have determined to keep in the swim, and will meet the market at prices which will hold the trade. Under such contradictory influences the market is naturally very much unsettled, and exact quotations an impossibility, but there can be no question that the tendency is toward lower figures. In finished products similar conditions prevail. There is hardly a mill that claims to be running full, the majority are making half to two-thirds time, while some are preparing to shut down indefinitely. The immediate outlook therefore is by no means bright, and about the best that is hoped for is that things will be no worse; betterment is not looked for in the near future, although if there is going to be any improvement at all, it should be felt within the next two or three weeks. The Pencoyd branch of the American Bridge Company have decided to suspend operations indefinitely as far as regards the Steel plant. The reason for this action is said to be that there is not enough business to run both the Pittsburgh and Philadelphia mills, and it was therefore decided to consolidate on the Pittsburgh plant until there is work enough to employ them both.

Pig Iron.—It is becoming clear that it will require a lower level of prices than has yet been quoted before large buyers can be induced to place orders. Inquiries during the past week were encouraging, but the amount of business forthcoming was the reverse of that. Meanwhile some of those who bought heavily for the last quarter of the year are asking for reduced tonnage on their orders, while some intimate that they will be unable to take deliveries of anything, and give no date at which they expect to take them. This surely cannot be considered a healthy state of affairs, and in view of such conditions it is not surprising that the feeling is weak and unsettled. It would probably be a good thing all around if prices could be dropped to a point which would insure confidence that bottom has been reached. On a dull, sagging market everybody is afraid, but on a drop sharp enough to drive out poorly equipped and badly located plants there would be some chance of recovery, or at least a reasonable certainty that there would be no further decline. Some large concerns are probably working with that object in view, as they are determined to hold their trade, and are therefore willing to meet the demand in a liberal spirit. Prices are more or less nominal, but at this writing the range would be as follows (Philadelphia or equivalent points):

No. 1 X Foundry	$17.00 to $17.50
No. 2 X Foundry	15.75 to 16.50
No. 2 Plain	14.75 to 15.25
Standard Gray Forge	14.25 to 15.00
Basic	14.75 to 15.00
Low Phosphorus	21.00 to 22.00

Steel.—The market is in a very chaotic condition, so that exact quotations are impossible at the present time. Those who have to buy Steel make their bids, which are met by counter offers, which usually land the business. Not much Steel is wanted, and $27.50 to $28, delivered, would probably be a fair quotation for ordinary sized lots, but for large lots much better could be done.

Plates.—Business is extremely light, and there are very few mills that are making their normal output. There is little or nothing coming in from large consumers, while strikes in the Boiler trade cut off a great deal of business from that source. Prices remain as last quoted—viz., for city and nearby deliveries, base prices up to 100 inches: Tank Steel, both Sheared and Universal, 1.75c. to 1.80c., in large lots; Flange, 1.85c. to 1.90c.; Commercial Fire Box, 1.95c. to 2c.; Locomotive Fire Box, 2.25c. to 2.30c.; small lots, 10c. to 15c. per 100 extra; 100 to 110 inches, 0.05c. extra; 110 to 115 inches, 0.10c. extra; 115 to 120 inches, 0.15c. extra; 120 to 125 inches, 0.25c. extra; 125 to 130 inches, 0.50c. extra; over 130 inches wide, 1c. extra; Plates under ¼ inch on edge, 0.10c. extra; under 3-16 inch on edge to No. 8, 0.15c. extra; No. 9, B. W. G., 0.25c. extra; all Sketch Plates, 0.1c. extra; all Circle Plates, 0.2c. extra.

Structural Material.—The demand is so light that very few mills can run more than half or three-quarters full. The American Bridge Company's mills at Pencoyd are to be closed, pending better labor conditions and a better movement of material. Prospects are certainly not good at the

present time; on the contrary, the outlook for the fall and winter months is very poor. Prices unchanged at 1.73½c. to 1.85c. for Beams, Channels and Angles, according to specifications.

Bars.—As things go, the Bar trade is not so very bad. There is not much money in it at present prices, but raw materials are coming down, and if current rates for Bars can be maintained there would not be much cause for complaint. The difficulty is to secure the volume of business, which at present is not near enough to go around. Prices vary from 1.50c., delivered, for Ordinary Bars, up to 1.60c. for first-class quality, with a good deal of business at between figures, and at 1.73½c. for ordinary Soft Steel Bars.

Sheets.—Business is fairly active, and mills have had no occasion to curtail their output thus far. Considering the dullness in other lines, the Sheet trade holds up very well, although prices are a little irregular and not very strong.

Old Material.—Prices are weak and lower, although there is rather more business at the reduced figures, bids and offers for deliveries in buyers' yards being about as follows:

Old Steel Rails	$15.50 to $16.00
Heavy Steel Scrap	15.25 to 15.50
Low Phosphorus Scrap	23.00 to 24.00
Old Steel Axles	18.00 to 19.00
Old Iron Rails	18.00 to 19.00
Old Iron Axles	20.00 to 21.00
Old Car Wheels	17.00 to 18.00
Choice Scrap, R. R. No. 1 Wrought	17.00 to 17.50
Country Scrap	14.00 to 15.00
Machinery Scrap	14.50 to 15.00
No. 2 Light Scrap	14.00 to 15.00
No. 2 Light (Ordinary)	10.00 to 11.00
Wrought Turnings	10.50 to 11.00
Wrought Turnings, Choice Heavy	11.50 to 12.00
Cast Borings	7.25 to 7.75
Stove Plate	11.50 to 12.00

Cleveland.

CLEVELAND, OHIO, September 22, 1903.

Iron Ore.—The sudden introduction of labor difficulties of a pronounced type has made it impossible to continue the swift movement of Ore down the lakes, and the season will end abruptly. The struggle for the mastery between the United States Steel Corporation, represented by the Pittsburgh Steamship Company, and the American Association of Masters and Pilots will result in curtailing the shipment of Ore by that company by 1,250,000 tons, and will likely confine the movement for the year to 25,000,000 tons. The immediate effect is to cause wild cargoes to be taken a little more freely by the Steel Corporation, which is hiring boats to make up for those vessels that have been sent to dock for the season. This is strengthening the lake rate on Ore, but so far the demand for boats has not exceeded the supply, although the situation has become considerably stronger. The Steel Corporation expect at the present rate of shipment to have all of the Ore brought down the lakes that they will use this year by October 15. Then all of their boats will be in dock, and all of the accounts will be closed. The rates of carriage meanwhile continue to be stable at 80c. from the head of the lakes, 72½c. from Marquette and 60c. from Escanaba. This cessation of Ore shipment removes the possibility of any sales being made. Discussion has already started as to the prices for next year, and, while no action is likely for many months, there is a general impression that prices will be materially reduced from the present rates of $4.50 for Bessemer Old Range and $4 for Bessemer Mesaba.

Pig Iron.—In no grade is there any buying for other than immediate use. Some of the strength which seemed to infuse itself into the market a week ago has gone again, and the market is comparatively flat. In Foundry there are calls for a few hundred tons, but they are all for immediate shipment, the best possible time for their delivery being asked. As to prices, the market still shows a tendency to obtain activity at the expense of values. No. 2 Foundry is being quoted at $15, in the Valleys. That brings the price to $15.85, Cleveland. That price puts the Northern foundries in competition with the Southern Irons at their own price. The non-association stacks of the South are selling at $11.50, Birmingham, to which is added the $4.35 rate of freight to make up the Cleveland price. The furnacemen are indicating again their belief in the market by announcing that the present scale of prices for Foundry applies to Iron to be delivered up to January 1 and no further. In Basic Iron it is understood that on a legitimate inquiry it could be purchased in such quantities as remain unsold for fourth-quarter delivery at $16, in the Valleys. Bessemer is off the market, and is hardly quotable. The price holds nominally at $16, in the Valleys. Good Foundry Coke is steady and strong, the market holding at $3 to $3.50, at the oven.

Finished Iron and Steel.—The effort to instill firmness into the Bar Iron trade was almost without avail. The market has been weak and business has been done in some quantities, but at prices which have not been very profitable, especially at prevailing prices of raw material and labor. The general market quotation is now about 1.45c. at the mill, with some of the smaller concerns getting business at lower prices, 1.40c. at the mill not being uncommon. The Steel situation, however, is stronger and 1.60c., Pittsburgh, is bottom price on that material. The sales of Bar Iron have amounted to considerable, one lot of 1000 tons having been covered and others of smaller size being noted. The sale of Steel Bars has been a little heavier too. In Plates there has been a little better buying. One order of 1500 tons has been noted, and two or three contracts of smaller size have been recorded. It is also said that the specifications have been a little heavier. The price has held absolutely without deviation at 1.60c., Pittsburgh, Steel prices being unassailed in the downward trend of values. In Structural there has been very little done. The contracts which were mentioned a week ago are pending. A few small sales have been recorded where material has been needed to finish out buildings that have been under way. The specification on old contracts has continued. The price holds at 1.60c., Pittsburgh. While the jobbers are getting no business, their prices have been steady at 2.15c. out of stock. The Sheet situation is weaker than it was. The consumer who comes into the market with a proposition to take a certain good tonnage at lower prices has a much better show of getting it than he had before. We continue to quote, nominally, No. 27 Black Sheets, out of stock, 3.05c. as a basis; No. 14 Blue Annealed, in car lots at the mill, 2.20c.; No. 27, One Pass Cold Rolled, in car lots at the mill, 2.75c.; No. 27 Galvanized Sheets, out of stock, 4c. The Billet market has been dull. If there has been any selling of importance it has come from the independent concerns. The market is still quoted at $27.50, Cleveland, for 4 x 4 Bessemer. The Rail trade is dull and only a few casual inquiries are received from electric lines, which, however, show tendencies to expand still further.

Old Material.—The Scrap market is almost dead. The buyers are not very anxious for material, and the jobbers, having slack business, are cutting prices to get such business as is going. Prices are nominal at these figures, all gross tons: Heavy Melting Steel, $16; Old Steel Rails, $17; Old Iron Rails, $21; Old Car Wheels, $19; Railroad Malleable, $16; Cast Borings, $8. All net tons: No. 1 Railroad Wrought, $15; No. 1 Busheling, $13 to $13.50; Wrought Turnings, $11; Iron Car Axles, $22.50; No. 1 Cast Scrap, $14.50; Stove Plate, $11.

Cincinnati.

FIFTH AND MAIN STS., September 23, 1903.—(*By Telegraph.*)

While it can be truthfulliy stated that Southern Pig Iron is not being offered for sale on a less basis than $11.50, Birmingham, for No. 2 Foundry, yet the technical truth is undoubtedly being dodged by some furnaces of the association, who are selling by analysis Iron which is practically a No. 2 for $11.25, Birmingham. There is hardly enough of this character of selling, however, to give the general market a lower basis than that of $11.50. Some of the association furnaces who are adhering strictly to the $11.75 basis are complaining that they are able to secure but a very small amount of the business going. Sales of Iron amount to as many in number as they did a year ago, but the tonnage is, of course, very much smaller. Buyers are ordering very gingerly and usually insisting upon very prompt shipment. Gray Forge has been very inactive on the basis of $10, Birmingham. The action of the Southern Association furnaces in restoring a differential in favor of the Eastern markets is causing a great deal of dissatisfaction on the part of Western buyers and is said to be one cause of business being thrown by preference to what are termed "outside" furnaces. In spite of all irregularities the market is steadier than it has been for some time, and the feeling that the bottom is just about reached seems more settled. Freight rates from the Hanging Rock district, $1.15, and from Birmingham to Ohio River points, $3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1	$15.25 to $15.75
Southern Coke, No. 2	14.75 to 15.25
Southern Coke, No. 3	14.25 to 14.75
Southern Coke, No. 4	13.75 to 14.25
Southern Coke, No. 1 Soft	15.25 to 15.75
Southern Coke, No. 2 Soft	14.75 to 15.25
Southern Coke, Gray Forge	13.25 to 14.25
Southern Coke, Mottled	13.25 to 14.25
Ohio Silvery, No. 1	20.15 to 21.15
Lake Superior Coke, No. 1	16.15 to 16.65
Lake Superior Coke, No. 2	15.65 to 16.15
Lake Superior Coke, No. 3	15.15 to 15.65
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$25.75 to $26.25
Lake Superior Car Wheel and Malleable	23.00 to 23.50

St. Louis.

CHEMICAL BUILDING, September 23, 1903.—(*By Telegraph.*)

Pig Iron.—A moderate degree of buying continues, with a majority of specifications for quick delivery. It is purely a repetition of recent market conditions, and the chances are we will see nothing better for some time to come. Buyers are watching developments closely and are ready to step in and cover, on what is thought will be a fairly liberal scale, as soon as general conditions in the Iron and Steel situation

assume a more definite aspect. Prices are on the same basis as last report, and quotable, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry	$15.75 to $16.00
Southern, No. 2 Foundry	15.25 to 15.50
Southern, No. 3 Foundry	14.75 to 15.00
Southern, No. 4 Foundry	14.25 to 14.50
No. 1 Soft	15.75 to 16.00
No. 2 Soft	15.25 to 15.50
Gray Forge	14.25 to 14.50
Southern Car Wheel	26.50 to 26.75
Malleable Bessemer	18.50 to 19.00
Ohio Silvery, 8 per cent. Silicon	22.50 to 22.75
Ohio Strong Softeners, No. 1	18.75 to 19.00
Ohio Strong Softeners, No. 2	18.25 to 18.50

Bars.—The movement in this department has been good the past week and jobbers' shipments figure a considerable amount. Quotation in lots from store, 2.15c. to 2.20c., for both Iron and Steel.

Rails and Track Supplies.—The demand and inquiry for Rails and Track Supplies has been in somewhat diminished volume the past week, but although quieter, the market ruled steady, and we quote as follows: Spliced Bars, 2.05c. to 2.15c.; Bolts, with Hexagon Nuts, 3.05c. to 3.15c.; with Square Nuts, 2.90c. to 3c.; Spikes, 2.15c. to 2.25c.

Angles and Channels.—Business of some volume is being executed by the jobbers on the recently prevailing price basis of 2.25c., in lots from store.

Pig Lead.—No material change in the Lead market. The demand is fair, with offerings rather light. Missouri brands are selling at 4.40c. to 4.45c.

Spelter.—General market conditions are strong, with demand good and supply of a limited order. Quick delivery material commands 4.75c., with 4.60c. to 4.65c. for future supplies.

Pittsburgh.

PARK BUILDING, September 23, 1903. (*By Telegraph.*)

Pig Iron.—The movement now under way by the leading Pig Iron producers to close down a sufficient number of blast furnaces, mostly in the Central West, to balance more evenly output and consumption, is the item of interest in the Pig Iron trade this week. The producers of Pig Iron in the Pittsburgh district, Cleveland, Wheeling and the Valleys will meet in Pittsburgh this week to take this matter up. Demand for Pig Iron has been so dull for some time that the furnaces are piling stock pretty rapidly, and it is to prevent heavy stocks of Iron from hanging over the market that the movement to restrict output has been taken up. There is perhaps a little more inquiry for Pig Iron, but actual sales are in small lots only. Bessemer Iron seems to have settled down to $16, at Valley furnace, or $16.85, Pittsburgh. Occasionally stray lots are offered by dealers at slightly lower prices. Forge Iron is held at about $14.50, Pittsburgh, and No. 2 Foundry at $15.75 to $16 for Northern makes. Basic Iron has been offered at $15.40, Valley, or $16.25, Pittsburgh, but on a firm offer it is likely $15, at furnace, could be done. We note sales of 4000 to 5000 tons of Standard Bessemer at $16, Valley, but several lots, ranging from 200 to 500 tons, have been sold at slightly lower prices.

Steel.—The Steel market continues very quiet and three or four of the Bessemer and Open Hearth plants in the Pittsburgh and Wheeling district are closed for repairs and lack of specifications. The Open Hearth plant of Clairton Steel Company, which is idle, is expected to start next week. Outside interests continue to offer small lots of Bessemer and Open Hearth Billets and Sheet Bars at 50c. to $1 a ton under pool prices. The Billet mills reaffirmed prices last week on the basis of $27, Pittsburgh, Wheeling or Valleys, for 4 x 4 inch Bessemer Billets and $28 for Open Hearth. Sheet and Tin Bars, long lengths, take $1 a ton advance and short lengths $1.50 a ton advance.

(By Mail.)

The Iron trade is going through a very critical period, and what the outcome will be is very difficult to foretell. Events of the past week have very fully demonstrated that the Steel business of this country seems to be in the grasp of Wall street, and the ups and downs of the stock ticker are now construed to represent the ups and downs in the Steel business. That the Steel business should have gotten into this condition is deplorable, but such is the case. A recent illustration of the way the Steel business is being juggled is shown in a report, started in the East last week by stock brokers, that at the meeting of the Rail and Billet mills prices of Rails were to be reduced $1 a ton and Billets $2.50 a ton. The immediate effect of this was to scare buyers all over the country, but the report had no foundation in fact whatever. The slump in the stock market has done more than anything else to bring about the present unsatisfactory condition in the Steel trade, and is, in fact, almost wholly responsible for it. The slump in values of industrial securities has been taken by the public to mean that the Steel business is demoralized, and that prices on all kinds of Iron and Steel products are bound to be very much lower. Just what will remedy the present condition is hard to find, and until the trade draws a line separating the Steel business from Wall street there is going to be more or less trouble. A conservative banker in this city estimates that in the last two months fully $20,000,000 in cash has been sent out of Pittsburgh to New York to protect holdings of stock, and the withdrawal of this immense sum of money out of legitimate business has brought about a tightness in the local money market and collections are worse than for a long time. Credits are being very closely scrutinized, and it is really difficult to find anything in the whole situation that is encouraging. Back of it all, however, is the fact that the country is in a perfectly sound condition. The consumption of Iron and Steel of all kinds up to two months ago was the heaviest ever known. The corn and wheat crops have not been ruined by frosts, as reported by the stock ticker, but the corn crop this year will be above the average. Labor has been well employed at the highest rate of wages ever known, and it does not seem there is good cause for the unsatisfactory condition of the Steel trade and its somewhat doubtful future. Confidence is sadly lacking, and consumers of all kinds of material are either using up stocks or else are buying from hand to mouth only. A movement is under way by the large Iron and Steel interests to restrict the output of Pig Iron and Steel, and to prevent large stocks from hanging over the market. A meeting of the blast furnace operators of the Mahoning and Shenango valleys was held on September 19, to consider the matter of shutting down a sufficient number of blast furnaces in the two valleys to keep output about equal to demand. It was decided that the movement, to be effective, would have to embrace not only the blast furnaces in the valley districts, but in the Pittsburgh, Wheeling and Cleveland districts as well; and to accomplish this a meeting of the blast furnace interests of Western Pennsylvania, Eastern Ohio and West Virginia will be held in Pittsburgh during the latter part of this week. It is proposed to shut down a sufficient number of blast furnaces to prevent any undue accumulation of stocks and to steady the market. The movement will very likely go through, as all the blast furnace operators approached seem favorable to it. Very little is doing in Pig Iron or Steel, and the tone of the Pig Iron market is extremely weak. Furnaces quote $16, at furnace, or $16.85, Pittsburgh, for Standard Bessemer Iron, and any Iron that is being offered at lower figures is emergency Iron that has to be moved or that has some unusual condition attached to it. The Billet mills reaffirmed prices at their meeting last week, only a few minor changes in the schedule having been made by reason of changes in freights. In Structural Steel and in the larger sizes of Pipe, as also in Sheets and Wire products, there is a good volume of business, but in other lines, such as Plates, Iron and Steel Bars and Skelp, demand is dull and prices weak. The whole situation in Finished Iron and Steel is just in the shape that a heavier demand cannot be expected until buyers are satisfied that present prices are going to hold. There is no incentive to buy ahead, and consumers are likely to stay close to shore on purchases for some little time.

Steel Rails.—At the meeting of the Steel Rail mills, held in New York on Thursday, 17th inst., the price of Steel Rails, Standard Sections, was reaffirmed at $28, at mill, in 500-ton lots and over. No large contracts have recently been placed, the few orders going being for small lots only.

Ferromanganese.—There is very little inquiry, and we quote English and domestic 80 per cent. Ferro at $48 to $49 in 50-ton lots and over, delivered.

Spelter.—The market is extremely firm, and demand is quite heavy. Prime Western Spelter for spot delivery is held at 5.75c. to 5.78½c., Pittsburgh.

Muck Bar.—There is no demand for Muck Bar and prices have gone off sharply. We quote 28, Pittsburgh, for domestic makes, and on a firm offer this might be shaded.

Iron and Steel Bars.—There is only a fair demand for Bars and for small lots only. Buyers have not enough confidence in the future to contract ahead. While some former consumers of Steel Bars may change over to Iron on account of lower prices of the latter, yet others would prefer to pay a little more money for Steel Bars on account of their uniform quality. Prices of Iron Bars are lower at other points than for Pittsburgh delivery, but are held here at about 1.55c. For a nice specification a little lower price might be made. Official prices on Steel Bars are firmly held, but tonnage is limited, and some of the larger mills are badly in need of specifications. We quote Steel Bars at 1.60c., Pittsburgh, in carloads and larger lots. For quantities less than 2000 lbs., but not less than 1000 lbs., $2 a ton additional is charged, and less than 1000 lbs., $6 additional.

Structural Material.—The Atlanta depot, at Atlanta, Ga., and the Steubenville bridge, bids for which were opened last week, have not yet been awarded, but contracts for these two buildings, which will require about 7,000 tons, are expected to be placed this week. No large contracts have come up in the past week, but a great many small orders are being placed which aggregate considerable tonnage. The outlook is good and a great many building projects which were suspended on account of labor troubles, will soon actively be

taken up again. Mills are making prompt deliveries, and bridge and Structural shops are able to get Material as fast as needed. Some of the smaller Structural shops have very little work ahead. Prices are firm, but without change, and we quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—New tonnage being placed in Plates is only fair, and buyers still refuse to contract ahead. Some of the largest consumers are not specifying on contracts placed some time since. The Pressed Steel Car Company of this city, when running their various plants full time, consume about 1200 tons of Plates and Shapes per day, but have closed down their works for a month or longer. Prices are firmly held and we quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—Some of the mills report a little better inquiry for Sheets, and the tone of the market is fairly firm. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.55c. to 2.60c., and No. 28 at 2.65c. to 2.70c. for carloads and larger lots. Galvanized Sheets seem to have firmed up a little, probably due to the higher prices and scarcity of Spelter. We quote Galvanized at 75, 10 and 2½ per cent. off, for ordinary specifications in carloads and larger lots. For very desirable specifications possibly a little lower price would be made by a few mills. Jobbers charge the usual advances over above prices for small lots.

Hoops and Bands.—There is a fair tonnage going in Hoops and Bands, but the Cotton Tie season has not opened yet. Prices are said to be firmly held. We quote: Cotton Ties, 87c. in 10,000-bundle lots or over; 92c. for carloads; Steel Hoops, 1.90c. in 250-ton lots and 2c. for carloads; Bessemer Bands, 1.60c. to 1.70c. for Open Hearth. Extras as per Steel card.

Rods.—Several fair sized sales of Bessemer Rods to Wire mills have been reported in the past week. We quote Bessemer Rods at $34.50 and Open Hearth at $35.50, at mill. Chain Rods made of special stock are $36.50 to $37, at mill.

Tin Plate.—There is nothing of special interest to note, demand being quiet. We quote at $3.80, Pittsburgh, for 100-pound Cokes.

Merchant Steel.—Buying of all kinds of Steel is more active and the leading mills report they are booking more tonnage than for some time. Tool Steel is in better demand, and Shafting is also looking up slightly. We quote: Open Hearth Spring, 2.30c. to 2.40c., base; Toe Calk, 2.25c., base, half extras; Tire Steel, 1.80c. to 2c. for usual sizes; Plow Slabs, Bessemer, 2.25c.; Open Hearth, 2.50c.; Tool Steel, 6½c., base, and upward; Shafting, 42 per cent. off in less than carloads and 47 per cent. in carloads, delivered in base territory.

Skelp.—The Skelp market is absolutely lifeless, and prices have declined sharply. We quote Grooved Iron and Steel Skelp at 1.60c. to 1.65c, and Sheared at 1.70c. to 1.75c., f.o.b. Pittsburgh. On a firm offer and desirable sizes it is possible these prices might be slightly shaded.

Pipes and Tubes.—As noted last week, demand for the smaller sizes of Merchant Pipe up to 6-inch has fallen off very much, with the result that some of the outside mills are going after tonnage more aggressively, and in some cases are shading prices. On sizes 6-inch and larger prices are very firm, and the mills are filled up for some months ahead. Discounts to consumers in carloads are as follows:

	Steel.		Wrought Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inches	75	65	72	62
7 to 12 inches	69	59	66	56

Merchant Boiler Tubes.

	Steel.	Iron.
1 to 1¼ inches	42½	39
1½ to 2½ inches	55⅔	38
2¾ to 5 inches	61	48
6 to 13 inches	55⅔	38

The outside mills rolling Iron Pipe are naming lower discounts than are given above. We may note, however, that on the smaller sizes of both Iron and Steel Pipe some of the outside mills are slightly shading these discounts.

Coke.—There is nothing of interest to report in the Coke trade, and the fact that a movement is under way to close down a number of blast furnaces in the Central West will, if carried out, mean a very much lessened demand for Coke. Strictly Connellsville Furnace Coke for prompt shipment is being offered at $2 to $2.10 at oven, while 72-hour Connellsville Foundry Coke is held at $3 a ton at oven. Furnace Coke made outside the Connellsville region is being offered at $1.75 a ton or lower, and Foundry at about $2.25 a ton at oven. Output of Coke last week in the Upper and Lower Connellsville regions was about 305,000 tons, a slight decrease over the previous week, and shipments were 12,910 cars.

Iron and Steel Scrap.—The Scrap market is practically lifeless, and in this condition it is useless to quote prices. No. 1 Heavy Melting Stock is offered as low as $16 to $16.50 in gross tons, if the buyer will take it in promptly. No. 1 Wrought Scrap is offered at $15 or lower in net tons. Other grades of Scrap have declined sharply in price. Consumers refuse to take in Scrap on contracts placed some time ago, and a good deal of material is being offered for resale at almost any price it will bring.

Iron and Industrial Stocks.

With no semblance of a panic, and no conditions even suggesting one, industrial stocks declined sharply during the past week. Under heavy realizing almost every business day saw a new low record in the common stock of the United States Steel Corporation. When 19⅛ was touched on Wednesday, September 16, that was thought likely to be bottom, but day after day lower prices were made until 16⅞ was reached on Monday of this week. A recovery then set in, and on Tuesday the stock sold up to 18⅜. The extent of the trading is shown by the aggregate of 313,520 shares in six days ending with Tuesday. At noon on Wednesday of this week the stock was selling at 17⅝. The preferred stock was also under pressure and sold down to 67¾, recovering to 69 on Tuesday and selling at 67⅝ on Wednesday at noon. The selling of these shares is partly attributed to bear operations and partly to liquidation by some large holders, who needed cash to protect other interests. The new 5's sold down to 73⅞ on the 16th, following the announcement of the extension of the time for the bond conversion to July 1. On Wednesday of this week they declined further, selling down to 72⅞. Severe declines occurred in other iron and industrial stocks. One of the sharpest was in the case of Crucible Steel preferred, which broke to 61¼ on the 18th from 69 on the day previous. Railroad equipment companies were depressed under rumors of the cancellation of orders for cars. United States Shipbuilding stock sold at 1 per share for both common and preferred. That some of these stocks were heavily oversold by bears is indicated by the sharp recovery in price when the market improved this week. Republic preferred was one, rising from 60½ to 65.

Dividends.—E. W. Bliss Company have declared the regular quarterly dividend of 2½ per cent. on the common and 2 per cent. on the preferred stock, both payable October 1. Books close September 26.

New York Air Brake Company have declared a quarterly dividend of 2 per cent., payable October 15. Books close October 1.

Alabama Consolidated Coal & Iron Company have declared a dividend of 1 per cent. on the common stock, payable October 18.

American Locomotive Company have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable October 21. On account of the annual meeting October 13 books close September 21, and reopen October 21.

Hall Signal Company have declared a regular quarterly dividend of 1½ per cent. on the common stock, payable October 1.

American Iron & Steel Mfg. Company have declared the usual quarterly dividend of 1¼ per cent. on the preferred stock, payable October 1.

The directors of the Ohio Fuel Supply Company, at Pittsburgh, have declared a quarterly dividend of 2½ per cent., payable October 15. This is an increase of ½ per cent. quarterly, placing the stock on a 10 per cent. basis instead of 8 per cent., as heretofore.

The Central Coal & Coke Company have declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable October 15.

The various export departments of the constituent companies of the United States Steel Corporation are to be consolidated and the future business in this line handled under the name of the United States Steel Products Export Company. The general manager will be J. A. Farrell, the present manager of the export department of the American Steel & Wire Company, 71 Broadway, New York.

The New York Machinery Market.

NEW YORK, September 23, 1903.

Conditions are unchanged. Business is very quiet, and hopes for an active resumption of purchasing this month are fast dying. New inquiries are extremely scarce, and there have been no developments in connection with the numerous propositions which have been hanging fire for a considerable time. There is scarcely any new work being launched.

Manufacturers appear to be spending considerable thought on increasing the efficiency and economy of their plants. Where such work necessitates the purchase of a machine or appliance, the order is placed without hesitancy. Consequently a large proportion of the business now being closed is for labor saving or cost reducing apparatus. This feature of the trade is directly in line with the growing sentiment that the business of the near future will be done under conditions of very much sharper competition than was that of the last few years.

Another set of plans for new car shops to be built by the Pennsylvania Railroad are out. These shops are to be located at Fairview, opposite Harrisburg, Pa. It is estimated that the buildings will cost about $500,000. Bids for their construction are now being received. They will be of brick, steel and corrugated iron construction, and will comprise two smith shops, 40 x 80 feet and 50 x 55.4 feet; a material building, 60 x 522.10 feet; a storeroom building, 60 x 237.6 feet; a lavatory, 60 x 69.6 feet; a planing mill, 40 x 60 feet; lumber shed, 60 x 97 feet; a boiler and engine house, 70 x 100 feet; machine shop, 80 x 80 feet; fan house, 45 x 60 feet; a storehouse and office, 50 x 140 feet, and an oil house, 25 x 50 feet.

Theo. L. Dunn, chief engineer of the Maine Central Railroad Company, Portland, Maine, advises us that orders for equipment of the new shops to be constructed at Thompson's Point have not been placed.

The Le Roy Plow Company of Le Roy, N. Y., who recently suffered a $75,000 fire loss, are now preparing plans for the rebuilding of the plant, and will soon be in the market for a full line of wood working machinery and some machine tools.

The Beaumont, Texas, shops of the Atchison, Topeka & Santa Fe Railway system, which were recently destroyed by fire, will be rebuilt. A. Lovells, assistant superintendent motive power, with offices at Topeka, Kan., is in charge of the work. No machinery purchases have been made as yet.

The Great Falls Power Company have revived the project of damming the Potomac River for the purpose of obtaining electric power for the supply of Washington, D. C. Reuben Shirreffs of 1420 New York avenue, Washington, D. C., has been retained by the company as chief engineer. It is intended to ultimately develop 48,000 horse-power. The first installment will, however, be of 28,000 horse-power.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will receive bids until October 6 for the following supplies for the New York Navy Yard:

Class 1. One ¼ horse-power portable electric blower.

Class 27. Fifteen portable Navy blacksmith forges and 15 portable rivet forges.

Class 28. One 5½ x 3¼ inch vertical single steam cylinder boiler feed pump, with 7-inch stroke; two 7¼ x 4½ inch, with 10-inch stroke; two 8 x 5 inch, with 10-inch stroke; one 10 x 6 inch, with 12-inch stroke; one 12 x 7 inch, with 12-inch stroke; six 3½ x 2⅛ inch, with 4-inch stroke; two 6 x 5½ inch, with 7-inch stroke; two 8 x 6 inch, with 12-inch stroke, and two 8 x 8 inch, with 12-inch stroke.

Class 29. One 20-inch hollow spindle pattern maker's lathe, with 10-foot bed.

Class 30. One foot power squaring shear.

Class 31. One 36-inch band saw.

Class 32. One No. 1½ Universal milling machine.

The works of the Westinghouse Machine Company on the South Side, Pittsburgh, have been abandoned and the equipment is now being removed to the new plant at Trafford City, above Wilmerding. The site of the old foundry has been bought by the Wabash Railroad and will be used for yard purposes. The plant was originally owned by the Robinson-Rea Mfg. Company, and was sold by them to the Westinghouse Machine Company.

The following are included in the bids opened September 15 at the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the various navy yards:

Washington.

Bidder 4. Fox Bros. & Co., New York.
15. American Air Compressor Works, New York.
25. McKiernan Drill Company, New York.
30. Chicago Pneumatic Tool Company, New York.
33. Ingersoll-Sargent Drill Company, New York.
36. Blaisdell Machinery Company, Bradford, Pa.
40. Rand Drill Company, New York.
60. Laidlaw-Dunn-Gordon Company, New York.

Class 39. One air compressor—Bidder 15, $2280; 60, $2290; 30, $2395; 36, $2490; 4, $2899; 25, $2666; 33, $3478.40; 40, $2507 and $2852.

Mare Island.

Bidder 9. W. H. Foster, New York.
17. Henshaw, Buckley & Co., San Francisco.
33. Brown Hoisting Machinery Company, New York.

Class 38. One belt driven plate scarfing machine—Bidder 17, $4540; 9, informal, no guarantee.

Class 39. One shearing, bending and punching machine—Bidder 17, $7620.

Class 40. One engine driven angle bar beveling machine—Bidder 17, $2120.

Class 41. One steel traveling tower and overhead tramway, complete—Bidder 33, $31,900.

Portsmouth.

Bidder 8. Marshall T. Davidson, Brooklyn, N. Y.
13. Henry R. Worthington, New York.
48. Wheeler Condensor & Engineering Company, New York.

Class 11. One surface condenser—Bidder 8, $1400; 13, $1550; 48, $1580.

Some machine tools are included in the supplies for the Western navy yards, bids for which will be opened October 20 at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until October 31 for a sewerage and water system at the naval station at New Orleans.

The following awards have been made for supplies for the Western navy yards, bids for which were opened September 1:

Manning, Maxwell & Moore, New York, class 67, one tenoning machine, $185; class 72, one emery grinder, $192; class 73, one heavy sheet metal power bending brake, $1300; class 78, one steam engine driven ship plate bending roll, $16,235.

George H. Tay & Co., San Francisco, class 66, one combined wire stringer, feed and cutter; class 74, one slip roll forming machine, $84.

Tatum & Bowen, San Francisco, class 68, one two-sided sticker or molder, $295.

Henshaw-Buckley Company, San Francisco, class 69, one power gang punching machine, $495; class 76, one pan forming machine, $155.

Pacific Tool & Supply Company, San Francisco, class 70, one engine lathe, $1200; class 71, one sheet metal worker's spinning lathe, $400; class 77, one engraving machine, $525.

There were no bids for class 65, one standard gas machine, and it will be purchased in open market.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 6 for a quantity of machine tools, electrical supplies, tools, electric elevator, pumping outfit, &c., for the Puget Sound Navy Yard.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until October 10 for a three-motor electric traveling crane of 20 tons capacity for the Boston Navy Yard.

The following bids were opened September 8 at the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the United States Naval Academy, Annapolis, Md.:

Bidder 1. Becker-Brainard Milling Machine Company, Hyde Park, Mass.
2. Bement-Miles Company, Philadelphia, Pa.
3. Drew Machinery Agency, Manchester, N. H.
4. Brown & Sharpe Mfg. Company, Providence, R. I.
5. Peerless Tool & Supply Company, New York.
6. Fairbanks Company, New York.
7. Manning, Maxwell & Moore, New York.
8. Garvin Machine Company, New York.
9. Niles-Bement-Pond Company, New York.
10. Hendey Machine Company, Torrington, Conn.
11. Smith-Courtney Company, Richmond, Va.
12. American Tool Works Company, Cincinnati, Ohio.

Class 1. One full universal milling machine and one set of milling tools—Bidder 10, $920; 7, $935; 4, $991 and $1041; 11, $1061; 6, 1090; 1, $1161.

Class 2. One 26-inch stroke shaper—Bidder 5, $769; 6, $880; 10, $875; 12, $897.

Class 3. One metal planer—Bidder 5, $1135; 6, $1175; 8, $1175; 7, $1260; 9, $1395; 12, $1395.

Class 4. One 10-inch slotting machine—Bidder 5, $1124; 2, $1125, 3, $1125; 7, $1280 and $1475; 11, $1171.

Class 5. One single spindle electrically driven upright sensitive drill—Bidder 7, $95; 6, $145.

Bids for the construction of a steel twin screw suction dredge for Savannah Harbor, Ga., were opened September 5 by J. C. Sanford, Captain of Engineers, United States Army, Philadelphia, as follows:

Great Lakes Engineering Works, Detroit, Mich., $206,000; time, 12 months 15 days; delivered at Detroit.

New York Shipbuilding Company, Camden, N. J., $214,000; time, six months; delivered at Camden.

Maryland Steel Company, Sparrow's Point, Md., $175,000; time, 12 months; delivered at Sparrow's Point.

The following bids were opened September 8 at the office of the Supervising Architect, Treasury Department, Washington, for an elevator plant in the Post Office at Minneapolis, Minn.

F. M. McGuire, Minneapolis, $15,500; time, February 5, 1904.

Marine Engine & Machine Company, New York, $21,250; time, February 1, 1904.

The Kinkade & Leggett Company, Columbus, Ohio, $21,000; time, November 31, 1904.

Otis Elevator Company, New York, $20,725; time, January 20, 1904.

The following bids for the construction of a steel hull stern wheel steamboat were opened by Charles S. Bromwell, Captain of Engineers, United States Army, New Orleans, La., on August 30:

Johnson Iron Works, Limited, New Orleans, $14,750.

McSweeney Shipyard & Foundry Company, Jeffersonville, Ind., $14,000.

Southern Marine Works, Algiers, La., $17,995. 43.

Thornton N. Motley, having severed his connection with the corporation heretofore known as the Thornton N. Motley Company, Incorporated, the name of the company has been changed to Motley, Green & Co., Incorporated. They will continue the railway supply business of the former concern at 12-16 John street, New York. Following are the officers of the new company: James M. Motley, president; Ashbel Green, vice-president and treasurer; W. W. Caldwell, secretary.

New York.

NEW YORK, September 23, 1903.

Pig Iron.—The local demand has diminished in volume. Inquiries are fair, but sales have been less numerous. Orders now being placed continue to be for immediate shipment, and buyers are urgent to have deliveries made as quickly as possible after contracts are looked. Notwithstanding the general quietness, negotiations are pending for some round lots of Pig Iron, indicating that a few consumers are disposed to cover contracts which they have taken for their own product. On this business Southern competition is even keener than it has been, and prices may be made which will take it South. We quote, at tidewater: No. 2 X Foundry, $15.75 to $16.75; No. 2 Plain Foundry, $15.25 to $16.25; Gray Forge, $14.75 to $15.75; Basic, $15 to $16. Tennessee and Alabama brands: $16.25 to $16.50 for No. 1, $15.25 to $16.25 for No. 2, $14.75 to $15.75 for No. 3.

Steel Rails.—While no contracts of any moment for Standard Sections of Steel Rails are being placed, the representatives of the mills are quite confident that ere long the railroad companies will re-enter the market and place orders for next year's delivery. The impression prevails that the numerous reports which have been circulated relative to the determination of railroad companies to retrench have been made for effect, and that their continued excellent traffic will make it necessary for them to purchase the usual quantities for replacements, if not some tonnage for extensions. The new Rail mill of the Lackawanna Steel Company, at Buffalo, is expected to begin to roll Rails in about a month. Standard Sections are quoted at $28, Eastern mill. Light Sections are selling at $30 to $32, at mill.

Cast Iron Pipe.—Manufacturers report plenty of inquiries for small lots. This branch of trade continues in exceptionally good condition. Prices on carload lots of 6 to 10 inch are $31.50 to $32 per gross ton at tidewater, and 12 inch upward $31.

Finished Iron and Steel.—The bids on the Blackwell's Island bridge will be opened on Thursday of this week. It is expected that the announcement of the bids received will show that one or two foreign bridge builders have entered into competition for this contract. Some of the domestic bridge manufacturers are of the opinion that, except for loss of prestige, it would not be a serious matter if this contract should go abroad. The restrictions are onerous, the conditions under which the bridge must be built make it more hazardous than those who have had no experience in this line can comprehend, and previous business of this character has not been very satisfactory in financial returns to those who have undertaken such work. The prospects for future business in the bridge and building line are more encouraging than in most other branches of trade. It is stated by those who have thoroughly canvassed the situation that at least 200,000 tons more are in sight now than at the corresponding period last year. The Plate trade is in a fairly satisfactory condition locally, but it is understood that the mills are restricting their operations on account of the reduction in volume of business coming from other sections. We quote, at tidewater, as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates, in carload lots, are 1.78c. to 1.85c. for Tank, 2c. to 2.10c. for Flange, 2.10c. to 2.20c. for Marine and 2.25c. upward for Fire Box. Refined Bars are 1.60c. to 1.80c.; Soft Steel Bars, 1.70c. to 1.80c.

Old Material.—Transactions are limited to lots of 25 to 50 tons, and these are not numerous. Prices are weaker. Small lots of Old Steel Rails have been sold at a shade under $13, on the line of the railroad selling. The fourth effort was made the past week by a railroad company to sell a large lot of Old Steel Rails, and they were again withdrawn. Plenty of Relaying Rails are being offered, but no sales have been made so far as can be learned. Quotations are nominal, but approximate figures are as follows per gross ton, New York and vicinity:

Old Iron Rails	$18.00 to $19.00
Old Steel Rails, long lengths	17.00 to 18.00
Old Steel Rails, short pieces	15.00 to 15.50
Relaying Rails, heavy sections	22.00 to 23.00
Old Car Wheels	15.75 to 16.25
Old Iron Car Axles	20.00 to 21.00
Old Steel Car Axles	18.50 to 19.00
Heavy Melting Scrap	15.00 to 15.50
No. 1 Railroad Wrought Iron	16.00 to 17.00
Iron Track Scrap	15.50 to 16.00
Wrought Pipe	11.00 to 11.50
Ordinary Light Iron	8.00 to 8.50
Cast Borings	6.00 to 7.00
Wrought Turnings	10.50 to 11.00
No. 1 Machinery Cast	12.50 to 13.00
Stove Plate	8.00 to 8.50

National Car Wheel Company.

Official announcement is made of the consolidation of several of the car wheel works throughout the country under the name of the National Car Wheel Company, with headquarters for the present at Rochester, N. Y. The company were incorporated September 22 with a capital stock of $9,000,000, of which $3,250,000 is 7 per cent. cumulative preferred stock, and $5,750,000 common stock. The merger has been under way for several months and was promoted by P. H. Brundage of 49 Broadway, New York. Besides the many benefits derived from the consolidation of several plants under one head, it is claimed that there will be a great advantage gained both to the manufacturers and consumers in the standardization of the manufacture of car wheels, which the company propose to do.

While it is probable that other plants will be taken over later, the present organization includes the Keystone Car Wheel Company, Pittsburgh, Pa.; Rochester Car Wheel Company, Rochester, N. Y.; Cayuta Wheel & Foundry Company, Sayre, Pa.; Maher Wheel & Foundry Company, Cleveland, Ohio; New York Car Wheel Works, Buffalo, N. Y.; Ramapo Car Wheel Works, Hillburn, N. Y.

The officers and directors are: President, Charles V. Slocum, president of the Keystone Car Wheel Company; vice-president, Charles T. Chapin, president of the Rochester Car Wheel Company; secretary, Charles A. Maher, vice-president of the Maher Wheel & Foundry Company; treasurer, William T. Goodnow, vice-president of the Cayuta Wheel & Foundry Company; J. R. Burnett, New York, vice-president of the New York Car Wheel Works; Howard C. Smith, New York, of the Ramapo Car Wheel Works; Frank D. Russell of the Rochester Car Wheel Works, Forsyth Wickes and Beverley R. Robinson of New York.

Announcement is made of a proposed automobile steel railway, laid with steel plate rails, to extend the length of Long Island. While primarily conceived for pleasure travel and speed trials, the project contemplates turning the road to commercial uses also. It is suggested that the road be given over to freight traffic during the night hours, leaving it free to pleasure vehicles during the day. Motor trucks, moving at 12 miles an hour, could cover 84 miles between midnight and seven o'clock in the morning. This would extend the available garden district of the island to double its present length, and, counting on a width of five miles, would lead to the clearing, fertilizing and cultivation of 200 square miles of land which now lies barren.

The bailiwicks of the New York and Philadelphia offices of the National Tube Company have been consolidated, and all territory of these two offices will in the future be in charge of Clifton Wharton, Jr. The New York office of the National Tube Company is in the Havemeyer Building, and the Philadelphia office at 267 South Fourth street.

Output of Fuel Oil in 1902.

Production of Heavy Petroleum in Texas and California.

WASHINGTON, D. C., September 22, 1903.—The forthcoming annual report of the United States Geological Survey on the production of petroleum in 1902, prepared by F. H. Oliphant, will contain an interesting section devoted to the production and utilization of the fuel oils of Texas and California, which last year amounted to nearly one-third the entire petroleum output of the United States. The success of the efforts made to market this enormous quantity of fuel oil, amounting to more than 24,000,000 barrels, is one of the most notable features of the industry, especially when it is remembered that two years ago the total production of these two fields was only about 5,000,000 barrels. Following is an advance abstract of this section of Mr. Oliphant's report:

The Industry in Texas.

From the present known deposits of petroleum and the possibilities that underlie the great coastal plain and the more elevated inland locations that are partially developed in this great State, it is impossible to put a limit upon the development of this industry as a source of cheap fuel. It is certain that an impetus will be given to many established lines of enterprise and to the creation of others that could never otherwise have been rendered profitable.

The production of petroleum in Texas in 1902 was 10,224,652 barrels, compared with 4,393,658 barrels in 1901. The gain in production in 1902 over the previous year was 232 per cent. The value of the output at 23.85 cents per barrel amounted to $2,438,519, or a gain of 195 per cent. These figures, however, represent only the number of barrels produced and sold, and at the end of the year there was in all fields a large amount of petroleum in individual tanks which was not sold. This was particularly the case in the Beaumont pool, where several millions of barrels had accumulated as stocks held by the producers, who preferred to store it rather than dispose of it at current prices. These stocks aggregated 5,719,448 barrels, which added to the total quantity actually sold gave a production for the State during the year of 16,000,000 barrels in round numbers.

The chief market for Texas petroleum during 1902 was for fuel. Much the larger portion was distributed by tank cars on the railroads. A considerable part was used to enrich manufactured gas. A large amount was transported by pipe lines from Beaumont and Sour Lake to Port Arthur and Sabine Pass, where it was loaded into tank vessels and transported chiefly to New York, Philadelphia and New Orleans. Smaller quantities were shipped coastwise to Morgan City, Bell Isle and Gretna, Louisiana, and to Tampa, Florida and Havana, Cuba. A very considerable amount was shipped in large tank vessels to Plymouth and Dover, England, to be used as fuel after the removal of the more volatile portions and partially as a gas oil for enriching manufactured gas, for which purpose it has been very successfully employed.

At the seaports of Port Arthur and Sabine Pass, the former being 18 miles and the latter 25 miles south of the Beaumont pool, several extensive refineries have been erected for the separation of the more volatile constituents of the crude oil. About 30 per cent. of the lighter products are removed by distillation, leaving a safe export petroleum. A percentage of the lighter products has been converted into illuminating petroleum, but the main bulk has found a market as gas oil.

In actual evaporative tests conducted during the past year, Professor Denton demonstrated that out of the ultimate 19.060 B. T. U. that are contained in 1 pound of Beaumont petroleum, 14.37, or 73.5 per cent. of the entire value, was made effective in practice, in boilers well proportioned and carefully handled, equal to 14.8 pounds of water to 1 pound of petroleum. In ordinary practice 13 pounds of water should be evaporated by 1 pound of Beaumont petroleum, as compared with 6 to 6.5 pounds of water evaporated by the bituminous coal from Indian Territory and New Mexico. The ratio of evaporation is found by considering the pounds of petroleum as the measure of the coal, and in this case the ratio is approximately 2. If a better grade of coal be used, more barrels of petroleum will have to be used to do the same work. One pound of ordinary Pittsburgh coal under fair conditions will evaporate 8.7 pounds of water at 212 degrees into steam. One pound of petroleum will evaporate 13 pounds of water under like conditions. The ratio would therefore be 1.5. Beamont petroleum of 22 degrees Beaume, or 0.921 specific gravity, weighs 7.68 pounds to the gallon, or 322 pounds to the barrel. In the first case, the ratio is as 1 to 2, or 1000 pounds of petroleum will equal 2000 pounds of coal, and as 1000 pounds of petroleum are equal to 3.1 barrels, so in the other case 1333 pounds of petroleum will equal 2000 pounds of coal, or 4.14 barrels will equal 1 ton of 2000 pounds of coal.

Petroleum has been shown to be an ideal fuel of the locomotive, because of its quick response to a sudden demand and because the heat can be as quickly cut off when the demand ceases. In the narrow limits of a locomotive fire box, where properly consumed, the combustion is more complete than in the case of coal. The oil is free from the disagreeable and dangerous effects of sparks, smoke and cinders, and as it passes into the fire box by gravity the exhausting labor of the fireman is saved.

The countries that must introduce this fuel on the largest scale for use in vessels on the high seas and on rivers are those that are the greatest producers of it, and those far off countries of the East that are destitute of large supplies of coal, which can only be obained at great cost by transportation. The use of oil fuel on shipboard obviates the work of the stoker, who performs one of the most physically distressing duties in the whole list of seafaring occupations. The delay, dirt and noise incident to loading coal and removing ashes are dispensed with, and for the same weight of fuel 50 per cent. is added to the steaming radius. For equal evaporative effect, as compared with bituminous coal, only 67 per cent. of weight is required, and 12 per cent. more weight can be stored in the same space. Fully 30 per cent. under ordinary conditions is added to the capacity of the boiler when liquid fuel is consumed, and it is an important fact that the calorific value of liquid fuel, when sold by measure, is almost the same from whatever source it may be secured. The utilization of the entire energy in petroleum will only be realized when it is exploded with an atmospheric mixture in the cylinder under high compression, when the costly, troublesome and extravagant boiler will be no longer necessary.

The successful and economic use of liquid petroleum in the Southwest and West has been fully demonstrated in its application to locomotives and stationary engines, as well as to a vast number of manufactures that require a large supply of fuel. In Eastern Europe and Southern Asia, along the path of the great ocean commerce and on the waters of the Black and Caspian seas, its use is increasing. Russia and Borneo and, to a lesser extent, Sumatra and Java, furnish the liquid fuel in these far off countries. At Singapore a central supply depot of considerable magnitude has recently been established, and there are lesser supplies stored at Suez, Bombay, Calcutta, Honkong and Yokohama. A number of large steamers employed on the Pacific Coast and in the Gulf of Mexico have used liquid fuel for a considerable length of time and have fully demonstrated its superiority.

The United States Navy during the past year conducted a series of interesting experiments, made under the direction of Rear-Admiral George W. Melville, chief of the Bureau of Steam Engineering. The results of these experiments, which have heretofore been published, are interesting to the entire industrial world, and especially to those engaged in solving the question of the use of liquid fuel under marine boilers. These tests demonstrate among other things that, assuming 1 pound of oil to be equivalent in thermal efficiency to 1.5 pounds of coal, which ratio was established by the Liquid Fuel Board in the conduct of an extended series of tests, an expenditure of 2.7 pounds of coal per horse-power as compared with 1.7 pounds of oil would be required. The

data secured by the board show an excessive loss in efficiency at the more rapid rates of combustion, due to the higher temperature of the escaping gases. These heat losses in the stack demonstrate the necessity for heating the air requisite for combustion when attempting to secure maximum boiler efficiency and power.

California Fuel Oils.

The production of petroleum in California in 1902 was 13,973,848 barrels, as compared with 8,786,330 barrels produced during 1901. The value, however, was less in 1902 than in the previous year by $106,223, the average price received during 1902 being 34.8 cents, as compared with 56.6 cents in 1901. At the end of the year 3,850,000 barrels of crude oil were stored awaiting transportation, and this quantity is not included in the production as given above. The existence of such enormous quantities of cheap fuel in the southern part of the State which by pipe line and ocean freight can be conveniently and cheaply transported to San Francisco, cannot fail to add materially to the prosperity of the entire Pacific Coast. As a result of the development of liquid fuel during the year, the importation of bituminous coal from foreign countries fell off 400,000 tons, and the domestic importation into the State declined 25 per cent. It is estimated that when the railroads of California are fully equipped to use liquid fuel they will consume 8,000,000 barrels per year, while at least 5,000,000 barrels additional will be used by the various industries of the State when the improved methods of transportation have become fully established. There is a market for a portion of this liquid fuel, and for such illuminating petroleum as can be manufactured chiefly from California crude oil in the Hawaiian Islands, Japan, China and the Philippines.

Experiments with California petroleum have demonstrated that if it is to be consumed inside of buildings or on steam vessels it should not contain any of the lighter products, which are in many cases found even in the heavy crude oil. It should have a fire test ranging from 220 to 270 degrees F. Under these conditions it is safe to handle, and there is no loss from evaporation. The important condition necessary to economic use is good combustion, and to accomplish this the oil should be completely atomized by a steam jet or compressed air, the latter being preferable because it more easily produces complete combustion and does not carry off so large a quantity of heat. To insure satisfactory results, it is necessary in all cases to have the jet of liquid fuel sprayed upon the hot fire bricks, and not come into direct contact with the plates of the boiler until the combustion has been completed. The best results have been secured by building an arch of fire brick over the grate bars with the crown of the arch coming within 5 or 6 inches of the bottom of the boiler and parallel therewith. About every fourth brick in the arch should be left out, and through this aperture the products of combustion may escape. Inside of this arch a loose checker work of fire brick should be placed upon which the petroleum should spray, and only the air necessary to combustion should be admitted through the openings of the grate bars. The fire boxes of locomotives which use petroleum for fuel must be arched with fire brick above where the spray strikes the back of the box, which must also be protected by fire brick, and an inverted arch of the same material should extend down into the pan with open spaces in the brick work and an open space at the front end for the admission of the air.

Tests of California petroleum, as compared with various coals, show that from 2.9 to 4 barrels of oil are equal to 1 ton of coal, according to quality, the poorest coal tested being that from British Columbia, while the best was Cardiff lump from Wales. The Atchison, Topeka & Santa Fé Railroad made an interesting comparative test of the cost per train mile of petroleum at $1.33 per barrel and coal at $6.65 per ton. Twenty-five passenger and freight engines on a 30-day run used 2077 tons of oil and traveled 87,063 miles, being 42.3 miles per ton, or 3500 miles per month per engine. Oil at $1.33 per barrel would at this figure cost 14.4 cents per train mile. Twenty-five passenger and freight engines on the same days and the same track, and under the same conditions, burning coal, showed a cost of 23.2 cents per mile. The oil was 15 degrees Beaumé, about the same as the Kern River oil, and the experiment showed a saving for oil of 38 per cent.

The transportation problem of the California oil field has not been fully solved, and the oil development of the State has been much retarded by the lack of facilities for getting the product to market. Most of the production is within reach of the railways by short pipe lines, but there has been a deficiency of cars to meet the demands, hence some consumers have hesitated to adopt oil as a fuel because of the uncertainty of getting a supply when needed.

W. L. C.

Metal Market.

NEW YORK, September 23, 1903.

Pig Tin.—While conditions here are still favorable for a squeezing of consumers who are in urgent need of the metal by holders of spot Tin, other elements have entered into the situation which prevent the clique who hold the strings on immediate supplies from being quite as dangerous as they might have been. The trend of the European market has not been in the least favorable to a pronounced upward movement here. In London a low record for the year was established during the last week. The local market shows a material decline, but spot and September are held at a high premium in order to make the few consumers who may be forced into the market to cover immediate requirements share the expenses of the "corner." It is said in the trade that the owners of spot supplies procured the metal at high prices. The statistical position is unchanged. Supplies at the beginning of this month were small, and the arrivals during the month were extremely light also, amounting to but 1600 tons. Spot to September are quoted 26.75c. to 27c., while October delivery is offered at 26.25c without finding buyers. In the London market, instead of a premium existing on spot, the position is just reversed, and at this writing there is a discount of 10 shillings on spot. This is due to the surplus of spot stocks in that market. At the Banca auction to-morrow 2500 tons will be offered for sale.

Copper.—No new developments are to be noted. The market is practically at a standstill. Large consumers are not buying at all, and the orders that are going through are only of a retail character. The "official" quotations are unchanged, naming the market "dull and nominal" with these figures: Lake, 13.75c. to 13.87½c.; Electrolytic, 13.62½c. to 13.75c.; Casting, 13.25c. to 13.37½c. These figures are shaded by ¼c., and on Casting brands sales are being made at prices below 13c. London has again declined sharply, spot dropping £1 2s. 6d. and Best Selected 10 shillings. Closing prices were: Spot, £55 7s. 6d.; futures, £55 5s.; Best Selected, £61. The exports until the 18th of this month aggregated 8391 tons, or about 1000 tons more than for the corresponding period of last year. The increased shipments, it is stated, were Copper sold about six weeks ago, when this market was 13c. The comparative statement of consumption in the United Kingdom during the first eight months of this year shows an apparent consumption of 51,510 tons, against 67,425 tons for the corresponding period of last year.

Pig Lead.—The campaign of the principal producing interests to force consumers to engage ahead of their requirements is still on, and whatever strictly spot metal there is here is commanding a premium of from 10c. to 15c. The Smelting & Refining Company carry no stock here, and what they call their spot price is for shipment within four weeks. While their prices are unchanged at 4.40c. for 50-ton lots and 4.42½c. for carload lots, Lead for immediate delivery brought from 4.50c. to 4.55c. during the last week. As a result of present conditions, Mexican Lead, which is refined and exported in bond, can now be sold to better advantage in this market than abroad. The London market declined to £11 2s. 6d.

Spelter.—The market is strong and unchanged, and spot to September closed to-day at 6c. The London market has declined to £21.

Antimony.—The market is weak and declining. Cookson's is quoted at 7.25c., while Hallett's has declined to 6.25c., and other brands are 5.75c. to 6c.

Nickel—Is quoted at 40c. to 45c. for large quantities, and 50c. to 60c. in small lots.

Quicksilver.—The market continues at $47.50 for flasks of 76½ lbs. London cables £8 10s.

Tin Plate.—The market is quiet. The American Tin Plate Company quote $3.80 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to $3.99, New York. English cables are 11 shillings 6 pence for Plates in Wales, a decline of 1½ pence.

The Spearman Furnace of the Shenango Iron Company, at Sharpsville, is closed down for repairs, and will be relined.

Cleveland Machinery Market.

CLEVELAND, September 21, 1903.

While many Cleveland manufacturers say they are as busy as ever and have plenty of work in sight, there has been unquestionably a sharp falling off in the business of the machinery manufacturers and metal-working trades in this district during the past 30 to 60 days. This fact is apparent in a large number of ways, and a number of causes are attributed for existing conditions. One large contractor states that, whereas three or four months ago it was impossible to secure favorable prices or deliveries on special machinery and structural work, at the present time manufacturers are looking for the work to keep their plants running, and are offering prices and deliveries that would have been phenomenal a short time ago. Another manufacturer states that inquiries are numerous, but that few orders are being placed. Evidently people are holding off to see what the next few months will bring forth. Dealers in machine tools state that the past thirty days have been the quietest in many months. Ordinarily business begins to pick up after the close of the summer vacation season, but this year June and July far excelled September in the amount of new business closed. Manufacturers who are approached on the subject of adding to their machine tool equipment state with one accord that they will do nothing more until indications are more favorable. A number of concerns which had fully decided to make important improvements this fall are now holding off. Sixty days ago dozens of local factories were advertising for skilled machinists and could not get them at any price, but now "No Help Wanted" signs are seen on every hand. A leading employment agency states that 25 per cent. fewer machinists are now at work in Cleveland factories than there were 60 days ago. A certain portion of this condition can be attributed to the fact that all of the automobile factories in Cleveland are closed down, throwing something like 1500 men out of work. In the majority of cases this shut down is only temporary, due to inventory and the planning of new models for another season, but in three cases it is due to the fact that automobile concerns have become financially embarrassed and have been obliged to close down. The action of the Licensed Automobile Manufacturers' Association in warning unlicensed manufacturers to cease infringing patents said to be controlled by the association has placed a quietus on affairs of several of the smaller automobile manufacturers in this district, and their future is in doubt.

The Baker Motor Vehicle Company, leading manufacturers of electric vehicles, have announced that they will erect a new factory in the spring. They have purchased a tract of land adjoining the plant now being erected on the L. S. & M. S. tracks by the American Ball Bearing Company with whom they are closely allied.

The Winton Motor Carriage Company are making active preparations for another season and expect to nearly double their output of this year, which is said to have been larger than that of any other manufacturer of high priced automobiles in the country. Last week they placed a large contract for machine tools with Strong, Carlisle & Hammond, and this about finishes up all they will require for the coming season.

The Atlas Car & Mfg. Company maintain that the demand never was heavier in their steel car and industrial equipment line. Although they recently erected an addition to their car department, they claim to be as far behind on orders as ever. To provide additional facilities they will shortly erect a building, 90 x 200 feet, adjoining their new shop on Lake street. They will install a crane, cold saws, special machinery, an air compressor outfit, together with pneumatic tools. They will add 200 horse-power of boilers and will erect a new steel stack for their boiler house. They recently shipped a number of dump bottom 20-ton all steel mining cars to a Western mining concern; charging cars, coal cars and an industrial equipment to a Milwaukee concern; a number of double truck steel cars to Philadelphia, and an electric pusher and charging outfit to Seattle, Washington. They shipped over 1000 cars of various sizes last month.

The Garry Iron & Steel Company state that their aggregate business is not showing a perceptible decline, but that customers are ordering in small lots, rather than in carload lots as in months past. The demand for structural material seems to be very good. They are furnishing structural steel for a building for the Sterling Company, Barberton; for a foundry building, 50 x 150 feet, for the National Malleable Castings Company, Cleveland; condenser house, bridge and conveyor outfit for the Akron Gas Company, Akron, Ohio; a 200-foot extension for the turn buckle department of the Cleveland City Forge & Iron Company, Cleveland. The demand for pneumatic cranes also continues very good, and recent shipments include cranes for the International Harvester Company, the Louisville & Nashville Railway, the Philadelphia & Reading Railway, and the Western Railway of Alabama. They are shipping two pneumatic car jacks to the Lake Shore & Michigan Southern Railway, at Ashtabula, and a crane and coal bucket conveyor outfit to the Louisiana & Arkansas Railway, Buchanan, Ark.

The General Automobile & Mfg. Company have been declared bankrupt, and all the machinery and equipment, together with about 25 automobiles in process of construction are being inventoried and will be offered for sale by Charles A. Scott, who represents L. J. Hammond, the receiver.

The Horseburg Forging Company are now occupying their new forging plant, and are extremely busy on all kinds of work. They are installing a 2500-pound steam hammer, built by Bement-Miles & Co., Philadelphia, and expect to install several other hammers in the near future.

The Cleveland Machine & Mfg. Company are shipping a large train of rolls to the Inland Steel Company of Indiana Harbor, Ind. They are supplying considerable material for an addition to the Emma Furnace, Cleveland. They are also building some special machinery for the American Silk Fiber Company of Cleveland.

The Cleveland Twist Drill Company claim there is no noticeable decline in the demand for their line of goods. In fact, they claim that the demand is heavier than it was last year at this time. In proof of this they point to the fact that they are as far behind on orders as ever before, despite the fact that they recently completed a large addition which is now producing goods. The demand from France, Russia and England continues very satisfactory.

Foot, Burt & Co., manufacturers of multiple drilling machinery, state they have not yet experienced any falling off in business. The demand for large tools from railroads continues strong. They are furnishing a six-spindle drill, weighing 14,000 pounds, to the Louisville & Nashville Railway; a locomotive frame drill, weighing 22,000 pounds, to the Chicago, Milwaukee & St. Paul Railway, and a six-spindle drill, weighing 12,000 pounds, to the City Forge & Iron Company of this city.

The Cleveland Punch & Shear Works Company state that they are receiving a large number of inquiries, but of late buyers seem to be holding off on orders. They claim to have a large amount of good business in sight for the last of this month and the first of next. Among recent orders for large tools were the following: Milner & Kettig, Birmingham, Ala., allegator shears; Erie Basin Shipbuilding Company, Brooklyn, one 36-inch punch; Pressed Steel Car Company, Pittsburgh, No. 4 motor driven bar shear; Mt. Vernon Bridge Company, Mt. Vernon, Ohio, four No. 3 radial drills; W. J. Adams, Joliet, Ill., one 19-inch throat punch; International Harvester Company, Hamilton, Ont., one multiple punch, 138 inches between housings; X. K. Porter & Co., Pittsburgh, one 42-inch and one 19-inch punch; Wm. Clifford, Jeanette, Pa., one 54-inch punch, and the Folsom Development Company, Sacramento, Cal., one 36-inch punch. They are shipping the last of a large order of tools to the Great Lakes Engineering Company of Detroit.

The Globe Machinery & Stampings Company have increased their facilities by adding two milling machines and a press supplied by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn.. They are building a new line of screw presses for testing dies. These are very powerful machines weighing 2000 pounds and having bolster plates 20 x 24 inches. They are completing presses and dies for the manufacture of pressed steel registers to take the place of cast iron registers, and will shortly solicit business on these goods, which they claim effect a saving in weight and permit of a neater finish.

The Garret-Cromwell Engineering Company state that there is a falling off in the amount of large engineering work in sight in this country. However, they are very busy on several large propositions recently closed up. They are engineering about $1,500,000 worth of work for the Eastern Steel Company of Pottsville, Pa., who are completing their open hearth furnaces. They will erect a new blooming mill and a 28-inch structural mill, and will overhaul the 10-inch and the 19-inch mills for this company. They have a commission to buy for the Ashland Iron & Mining Company, Ashland, Ky., a blowing engine, 44 x 84 x 60 inches, and will erect a new stack for that company. The new plant of the Detroit Iron & Steel Company, Detroit, for which they were engineers, will be blown in in about six weeks. It will have a capacity of 300 tons of foundry iron per day.

The Reserve Press Company state they are well satisfied with the demand for their sheet metal presses and dies. They are building three large presses and a number of dies for the manufacture of street car gongs for the Cheswick Mfg. Company, Cheswick, Pa.; a number of presses for the manufacture of toys for the Foyer Steel Stampings Company, Painesville, Ohio, presses for dinner pail work for Grier Brothers, Pittsburgh; multiple drilling machines for stove work for H. Adler & Co., Pittsburgh, and are at work on large orders for special dies for the Columbian Hardware Company, Cleveland, and the Standard Lighting Company,

Cleveland. They have just finished presses and dies for a sad iron plant for the Gem Mfg. Company, Mineral City, Ohio.

The Cleveland Molding Machine Company have equipped a new shop on South Water street and will manufacture molding machinery. Michael Pfarr and A. Cast are at the head of the company.

W. S. Krake of Ravenna, Ohio, trustee for the investors, has filed suit in the Common Pleas Court to recover $19,000 from the American Foundry & Machine Company of that city. It is claimed the company agreed to invest $150,000 and employ 100 men for five years, and that they have failed to comply with the contract. He claims that a large number of people were induced to buy real estate, and that $11,500 was turned over to the company from the sale of lots. The company were organized about two years ago by C. H. Lane of Cleveland to manufacture mining and other machinery. The plant was operated less than a year, and was leased to George H. Bowler & Co. of Cleveland. Recently the latter firm were placed in the hands of a receiver and the Ravenna plant was closed down. The investors ask for a lien on the property to prevent it being sold.

The Foyer Steel Stampings Company of Painesville have about completed their new plant. The building is 120 x 44 feet, and it will be equipped with presses and machinery for the manufacture of pressed steel goods, such as toy banks, toy wheelbarrows, wagons, bedsteads, &c. Albert Foyer, W. B. White, E. J. Thobaben, A. J. Scheuer, J. B. Vining and others are interested.

It is announced that the Baltimore & Ohio Railway will erect a new machine shop and erecting shop at Lorain, Ohio. The present shops at that place are badly handicapped through lack of facilities.

The Cleveland, Painesville & Ashtabula Railway Company are erecting their machine and repair shop at Painesville. The building will be fire proof, being erected wholly of concrete. They will install machinery for repairing and maintaining electricil equipment, also wood working machinery for maintaining cars.

A. N. Massey, H. A. Stahl and Wm. Hoppensack of Cleveland have secured a bonus and a site of four acres of land from the Board of Trade of Canal Fulton, Ohio, and will organize a company and erect a factory for the manufacture of steel mining cars, a newly patented gas pipe wrench, and other articles.

The Illinois Car Company of Urbana, Ohio, are rebuilding and repairing cars for a number of the large steam roads, and they are planning to increase their facilities for handling this work. H. A. McCord is president of the company and T. A. Edmondson superintendent.

George Altmeyer and T. A. Richards of Findlay, Ohio, are letting contracts for the building and equipping of an ice machine plant to have a capacity of 40 tons of ice per day. The plant will cost about $60,000.

The Ashland Steel Range Company of Ashland, Ohio, who commenced operations a few months ago, are preparing to add a foundry to their plant located on the Erie Railway, that city. The building will be 55 x 100 feet. A nickel plating department will also be added to the plant, enabling the company to do their own polishing and plating.

The Mansfield Railway Light & Power Company of Mansfield, Ohio, will erect a building 115 x 250 feet adjoining their present car house and will equip it for the work of repairing cars and motor equipments, and will also install a wood working department. They are also adding to the equipment of their power plant.

The Lima Electric Railway & Light Company of Lima are equipping a construction and repair shop to take care of the work of repairing car bodies and motor equipments. Both wood and iron working tools will be installed. J. A. Bendure is purchasing agent.

The Van Buren, Hock & Marvin Company of Findlay, Ohio, are negotiating with Toledo people with a view to locating their plant in the latter city. They manufacture a patent traction ditcher, steam pumps and gas house machinery. They are negotiating for 5 acres of land accessible to all railroads.

The Packard Motor Car Company, at present of Warren, Ohio, have about completed a large plant at Detroit, where they will engage in the extensive manufacture of automobiles. They have commenced the removal of their machinery from their Warren plant to Detroit.

The Lorain Steel Company of Lorain, Ohio, have about completed their new machine shop. They recently placed large contracts for machine tools with the Niles Tool Works, Manning, Maxwell & Moore and the Marshall and Huschart Machinery Company. Work on the new tube mills at Lorain is progressing rapidly.

The Black-Clawson Company of Hamilton have commenced work on a new foundry building, 55 x 280 feet, adjoining their present foundry. They will also erect a new power plant and have completed plans for a handsome office building, but it is not positive that the latter will be built.

It is stated that Lorain people have become interested in the Elyria Gas Engine Company of Elyria, Ohio, and that the company will be reorganized with larger capital and the plant improved for the purpose of increasing their facilities for the manufacture of the gas engines which they have been producing in a small way for some time.

The Fremont-Jaryan Company of Fremont, Ohio, have been incorporated, with $250,000, for the purpose of erecting and operating light, power and heating plants in several Ohio cities. They already have such a plant in Fremont.

The Gogel Mfg. Company of Toledo have been incorporated, with $20,000 capital stock, by J. Gogel, E. Gogel, C. R. Clapp, Em. Bretch, K. Risser and others. They will erect a shop on South Erie street, Toledo, for the manufacture of a new tire heater, of which Jacob Gogel is the patentee.

Cincinnati Machinery Market.

CINCINNATI, OHIO, September 21, 1903.

The month of September, while opening out in good shape, has so far failed to fulfill all that was promised. While it is an undisputed fact that all the shops are busy and are well taken care of for some time to come, yet trade has not developed as was anticipated, and is far from satisfactory in all its details. September one year ago was a remarkable month, and manufacturers in making comparison are not at all satisfied wth general conditions. As the quotations on iron have dropped it has produced a feeling of restlessness and apprehension that will require some time to quiet. Generally speaking, they seem to be waiting for something to turn up, and that "something" is believed to be stability in the iron market. The influence of Wall Street is shown in the matter of orders received. Several of the large trunk lines of railroads who previous to the "slump" were heavy purchasers, are proceeding very cautiously with the letting of contracts, evidently fearing that the end is not yet.

The Cincinnati Fall Festival was a grand success, as was predicted in *The Iron Age* a month ago, and was taken advantage of by manufacturers generally from all sections to personally inspect the many plants of this city, and also in viewing their exhibits on the ground. Cincinnati has shown that she is in the front rank in manufacturing circles, and the different machine tool industries were very largely represented at the Festival.

The Lane & Bodley Company exhibited one of their 250 horse-power Corliss engines. The Cincinnati Shaper Company had an extensive display of shapers; the Cincinnati Planer Company several sizes of their planers; the Cincinnati Milling Machine Company one of their No. 3 Universal Millers and Grinders; the Lodge & Shipley Machine Tool Company several of their 22 and 24 inch lathes; the Bickford Drill & Tool Company a No. 1 radial drill; the Cincinnati Machine Tool Company several upright drills; the Bradford Machine Tool Company large and small lathes; the G. A. Gray Company planers; Fosdick Machine Tool Company radial drills and heavy boring machine; Brown & Sharpe Mfg. Company, milling machine, gear cutters and grinders; Hamilton Machine Tool Company, upright drill; Hisey-Wolf Machine Tool Company, electric driven drills and grinders; Smith & Mills, shapers. The J. A. Fay & Egan Company's exhibit was exceptionally well arranged, and was under the supervision of Clifford Egan. Among the tools shown were a No. 50 band scroll saw, 97 gang dovetailer, No. 34 gauge lathe, No. 18 double cylinder planer, No. 1 band rip saw, No. 14 9-inch molder, No. 1 knife grinder, No. 59 box bored matcher. The Stewart Iron Works Exhibit consisted of iron urns, iron fencing, tree protectors and numerous fancy and useful articles.

The many large buildings that are now under construction are being rapidly hurried forward to completion. Notably is this true of the Ingalls Building at Fourth and Vine streets, which is built entirely of concrete, and has been the subject of much speculation as to the practicability of this class of construction. As the outside walls have gone up, the interior walls and ceilings are being finished floor by floor, so that with the roof on the interior is nearly complete.

The First National Bank Building, at Fourth and Walnut streets, is now fully under way, and the structural iron men are working night and day endeavoring to make a record for themselves. A rumor has been current that the Metal Trades Union were considering the advisability of reducing wages, but this, according to the officials, in incorrect.

The Houston-Stanwood & Gamble Company, manufacturers of slide valve steam engines, report that their sales for August and September, up to date, are a little ahead of the average sales for the previous months during this year. Owing to the fact that engines which are used for ginning outfits, have been purchased the demand for small engines for trade in the South is not quite so good as it was earlier in the year. Inquiries for medium and large engines are very good. Though they have very materially enlarged their factories within the last six months they still find themselves

extremely busy. They report collections, especially from the South, as having been very good indeed, their list of accounts receivable at the first of September being below rather than above the average for the early months of the year. They have lately opened an office at 405 Carondelet street, New Orleans, and have engaged the services of E. C. McCollough, who has been for several years with the Southern Supply Company, Mobile, Ala. Herman M. Houston is giving special attention working with their agents in Mississippi, Louisiana, Texas, Oklahoma and Indian Territory, in New Orleans and vicinity. They expect to carry a stock of small and medium sized engines in New Orleans in order to supply the local trade promptly. The trade in boilers, which they handle as dealers, has been beyond that of last year. Inquiries are very good.

The Rahn-Mayer-Carpenter Company, having thoroughly renovated their plant, are proceeding to fill what orders they have contracted for. They report that trade is opening up in good shape, and anticipate a very active and satisfactory fall business.

The Lodge & Shipley Machine Tool Company are securing their share of trade offering. They feel that the money market is quite a factor in the slowness with which trade seems to respond, but have no reason for complaint. They are at present adopting new methods in manufacturing, and are experimenting to increase the output of their plant. They report some very heavy orders from Chicago and the Northwest, and also from Canadian points, the latter section showing a very marked increase indeed.

The J. M. Robinson Mfg. Company are moving along with enough orders coming in to keep them busy. They have now under construction an 8-foot motor driven bending machine for 10-gauge iron for the Government navy yard, New York. Last week they shipped one of their curved molding machines to Manila, Philippine Islands.

J. H. Day & Co. are erecting a foundry on Harrison avenue and Bogen street that in some respects is quite an innovation. The building is of iron and concrete construction, and the foundry proper is located on the second floor. This they hope will facilitate the movement of their heavy castings by the aid of gravity. They are hurrying the completion of the plant as expeditiously as possible, and hope to be ready for business within a few weeks.

The Bickford Drill & Tool Company report trade to be looking up somewhat, and, while not as good as a year ago, they anticipate, with iron on a settled basis and money easier, a good business for the remainder of the year.

The Cincinnati Machine Tool Company have about completed the foundation for their new plant on Spring Grove avenue, and are ready for the superstructure. They will in a short time be in the market for a full line of new tools with which to equip this plant. They are very busy and have orders booked for some months to come.

The J. H. McGowan Pump Company are, as they have been for several months past, very busy. They report trade in the South as exceptionally heavy, having booked several very large orders for pumping machinery in this section. Their exhibit at the Fall Festival was very attractive and caused many comments on account of its uniqueness. They see no reason for any pessimism, and say that trade with them is as satisfactory as ever.

SALESMAN AND BUYER.

BY FRED. B. ELLSWORTH.

THE methods pursued by many salesmen lack to some extent that tact, judgment and diplomacy which characterize the successful salesman. This is especially applicable to those who are inexperienced in the consummation of business deals. There should exist between a salesman and buyer a certain amount of dignity and respect. Without it there is apt to be familiarity and eventually it proves detrimental to the interests of both.

Gauging a New Salesman.

A salesman in calling on the trade, especially if it be in a new territory, among trade that is unfamiliar to him, even though business relations have existed between them and his firm, cannot be too particular as to his manner and conduct. The more successful buyers have usually been salesmen themselves. They are good judges of human nature, and are very critical in their observations. They are not prone to take up with a new salesman. They weigh very thoroughly the new man, his general appearance, conduct and talk. First impressions are generally correct, and if they be commendable, rest assured the fact will not be lost sight of by the buyer.

Brevity.

In the great commercial world where men vie with each other there is little time for commonplace talk. Business should be transacted with quickness and dispatch. Buyers are busy men nowadays, and have no time to listen to funny stories, &c. The salesman who transacts his business in the fewest possible words and takes his departure as soon as expedient wins the lasting regard of a buyer under ordinary circumstances.

Mutual Respect.

There is regard and friendship in transacting business. It is not a cold blooded proposition, as many affirm, a matter of dollars and cents, or a desire to squeeze out of a concern everything possible. Reputable concerns notable for fair dealing recognize this fact and appreciate the same principles in others, and when these relations exist there is a mutual feeling of esteem and frindship. This sentiment is often shown by a buyer in his relations with a salesman. For instance, take a jobbing Hardware house. A salesman calls on the buyer and introduces himself for the first time. He displays his wares, if the buyer has the time and inclination. He may not make a sale, but he has had an opportunity to show what he can do, and has paved the way for future business. The next time he calls, the buyer no doubt recollects his previous visit. In the course of time relations are established. The salesman transacts his business in a businesslike manner, and his goods are found to be satisfactory and representations correct. Soon the buyer is one of his regular customers. The buyer has confidence in the goods and, better still, confidence in the salesman himself. As time passes and they become better acquainted a feeling of friendship manifests itself, and there is an interchange of courtesies. They admire each other irrespective of their vocations. It is here that familiarity should be avoided, for familiarity breeds contempt. How often have I heard buyers address salesmen in a personal manner, and *vice versa*, ignoring all rules of etiquette, certainly showing that a certain amount of respect had been lost sight of.

The Misfit Buyer.

There is nothing more injurious or detrimental to the interests of a business than a domineering, officious, self important buyer. He can give his concern an unfavorable business reputation, do more harm and cause it to lose more money than any one connected with it. When a buyer treats a salesman disrespectfully without provocation, the salesman, if he is a man of experience, makes the best of it, and yet may harbor a feeling of animosity and contempt, perhaps sparing no pains to advertise it. When this occurs, salesmen, in the vernacular of the road, are "on" to the buyer. I have frequently heard a salesman make inquiries relative to such and such a buyer, and receive such an unfavorable report that it prejudiced him against the buyer before he had seen him. Thus influenced, and with a feeling that it was immaterial whether he made a sale or not, he has called on the buyer, and, if he sold him, "held him up." Such methods, however, are inconsistent with business principles and dishonest as well.

Whatever a salesman does, it is imperative that he be a gentleman under all conditions, if he expects success. He should show proper respect to those he comes in contact with, and insist upon like treatment in return. If he is not respected, with few exceptions, it will be because he does not deserve it, in which event he has no business on the road. I do not know how it is in other lines of business, but I do know that it is applicable to the buyers for the wholesale Hardware, supply and iron companies throughout the United States, that with few exceptions they are as fine a lot of men as can be found in the business world.

Messrs. Winans and Highland, the former from Salt Lake City, Utah, and the latter from Traverse City, Mich., have bought the Chelan Hardware & Furniture Company, Chelan, Wash., and will continue the business without change in name. More money has been put in the concern, and a number of new lines have been added to those formerly carried. An up to date shop with facilities for plumbing, sheet metal work, harness and bicycle repairing has been established.

HARDWARE.

PERSONS connected with the production of the goods in the Hardware and allied branches of the trade will recognize the value of the series of articles now appearing in *The Iron Age* descriptive of the methods pursued by representative manufacturers in ascertaining the costs of their products. While there is wide diversity in the methods employed, those adopted by houses who have made a careful study of the subject cannot but be suggestive to other manufacturers. The various plans in operation for the direction of factories with a view to avoiding waste of time or material and securing the most efficient administration are also of special interest, as relating to matters which must have the attention of manufacturers who are to hold their own against competitors who are constantly on the alert for improvement in methods. The desirability of the best possible methods, which is obvious enough on general principles, will undoubtedly be impressed more and more upon the trade and become indeed a necessity, as the strife for business narrows the margin of profit. It will then be even more needful than at present to know what the actual cost of goods is and to make the organization and control of the factory so perfect as to keep the cost down to the lowest possible point.

As soon as the average man obtains a patent upon any device he considers that his fortune is made, and that he has only to let people know what he has done and where he lives to be overwhelmed with offers for it at his own price. The facts are that a patent is no more and no less than documentary evidence that the holder of it is entitled to its exclusive use. If he does not wish to use it, and will not sell it at a reasonable price, the inventor holds a piece of paper only, which deteriorates rapidly from the competition of other inventors in the same field.

What is a reasonable price for an invention depends wholly upon circumstances and conditions. If it relates to an article that will have only a moderate sale, a very moderate sum is all that can be expected, if, indeed, a manufacturer be found who desires to take the matter up. Inventors, however, are often without experience or knowledge in regard to the business side of the question and the difficulties which attend the introduction and marketing of even a meritorious article. Before a patent can make returns to any one much time and money must be put into it, and all this is to be recovered before the invester can recoup himself for his outlay, to say nothing of making money on the venture. The large sums said to be paid for patents that are not remarkable for novelty, being mere improvements upon existing machines or relating to some unimportant article, are mostly fiction. Inventors are apt to have an exaggerated idea of the value of their patents, and to think that they should receive for their patent what it may be worth after all the work required has been done and the demand has been created.

Condition of Trade.

The past week has been uneventful, so far as the Hardware market is concerned. The situation is substantially the same as at our last report. The same spirit of conservatism in purchasing on the part of the jobbing trade continues, as their stocks are for the most part sufficient for all requirements in sight and they are careful not to contract beyond their early needs. The general line of miscellaneous prices continues fairly steady, with soft spots developing here and there. There is a more confident feeling, on account of the reasonably satisfactory reports in regard to the crops, but the further decline in Steel stocks and other industrials has influence in keeping alive some uneasiness as to the future course of things. The country is undoubtedly suffering from labor agitation, or from the apprehension of it. Enterprise is on this account curtailed to a greater or less extent, but in spite of this fact the prospect for building or other enterprise is not especially unsatisfactory. While there is thus some hesitation among the producers of goods and the large operators throughout the country there continue to be satisfactory indications of active business and general prosperity. The retail merchants are generally doing a good business and report farmers and other classes in their communities as prosperous and with money to spend. The consumption of goods thus goes on apace and the volume of business compares well with last year. Another symptom which is full of promise is the more aggressive effort on the part of manufacturers to secure foreign trade. The return to lower prices here, while an unpleasant process, is recognized as essential to the attainment of the position toward which this country aspires, of supplying manufactured products in many lines for the world at large. Meanwhile in many kinds of Hardware and the lines closely related to Hardware there is an increasing variety and quantity going to foreign markets. When dull times come our manufacturers will doubtless take up seriously the finding of customers abroad.

Chicago.

(By Telegraph.)

While there has been no special degree of animation in any one line of Hardware manufacture during the week, the aggregate volume of business has been quite considerable and the outlook very encouraging. Manufacturers of Builders' Hardware note that they have experienced a decided improvement in the number of orders received during the week both from the city and country trade. They are mainly small contracts, but in the aggregate of considerable volume, building in a number of cases being resumed after several weeks' delay. A feature of significance, too, is that larger orders are being placed for stock. Agents for Shelf Goods also report the taking of better orders from jobbers, who are buying more freely, although a little later than a year ago. Another feature of note and of considerable interest is that a larger and larger proportion of the business being done is in lines which have until recently not been recognized as a legitimate part of the Hardware business, such as Saddlery, Sewing Machines, Iron Bedsteads, Paints, Bristle Goods, Leather Soles, Shoe Findings, &c. In heavy lines business is somewhat delayed by a tendency seemingly toward lower prices, and neither jobbers nor dealers desiring to increase stock on a declining market. Nuts and Bolts have been especially weak, but there has been a fair trade. Merchants have also noted an increased business in Anvils, Horseshoes and other Blacksmiths' Supplies, and quite a fair movement in wooden wagon material, but the demand for small lots of Beams and Channels and other Structural Material has been very light. A decline of from 15 to 18 per cent. is reported in the local market in prices of Malleable Steam Fittings. It is also stated that Cast Iron Fittings are weaker, but little, if any, lower. Prices for Steel Goods for the coming season are reported to have been made last week at Cleveland, but the association has declined to divulge prices through the mail, stating that representatives would be in the Chicago market on Wednesday and Thursday of this week, when it is expected that some business of moment will be transacted. The independent manufacturers of Shovels recently advanced prices to within 25 cents of the association goods, but while there has been no great activity, there has been a fair movement on this basis. Manufacturers' agents who have just returned from trips throughout the Northwest report liberal contracts for Steel Wheelbarrows.

Picks and other contractors' supplies. The increased capacity of Saw manufacturers enables them to make fairly prompt shipments on new orders for these goods, but, even so, it is claimed that deliveries are not made as promptly as desired by dealers in a number of cases. Agents for the largest manufacturers of Lawn Mowers in this section are said to have taken all the orders they can possibly supply and have been retired from the market for the past week or two. The jobbing trade seems to have been especially active during the last week, the wet, cold weather experienced for a few days stimulating the demand, especially for Wood Stoves and Gas and Oil Heaters. The movement is quite general among the various lines handled, but if there is any increase in activity it is in ordinary fall goods, especially Kitchen Utensils, Stove Handles, Pokers, Hods, Pipe, Enameled Goods, Coffee Mills and similar articles. Galvanized Tubs and Buckets have been reduced during the week in this market. In some degree this may be due to a weakening in the market for Steel Sheets, but it has not affected Baskets and other galvanized ware, while, on the other hand, Pig Lead is higher; still Spelter is easier. Copper is weaker. Manila Rope is said to be ½ cent higher, and a firmer feeling prevails for Sisal, although no change in the price of the latter has been made. The demand for Wire and Nails has continued liberal, and the tone of the market is firm. Pig Tin and Black Sheets are reported difficult to sell from mill, and further concessions are reported to have been made by independent producers.

St. Louis.

(*By Telegraph.*)

Although trade is active in the Hardware market, and we think but slightly below recent high averages, the weather conditions in the crop producing sections has been such as to cause a degree of uncertainty, which retards trade to some extent. It cannot be said that these conditions are universal, as in some sections, especially in the South, business gives promise of being unusually good. The continued uncertainty in prices in the Iron market is bound to be felt in manufactured lines sooner or later, and it is thought that both jobbers and dealers are curtailing orders as much as possible while present conditions exist. One particularly encouraging feature is the buying of opening stocks, which are of daily occurrence. In building lines the work on the World's Fair moves along steadily, but a general curtailment of local building contracts lessens the interest in the market for Builders' Hardware. All seasonable fall and winter lines bear the brunt of the demand.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—Trade conditions have been fair during the fall. The demand for goods has not been quite equal to that of last year, but it has kept up very well, and trade upon the whole has been satisfactory. The only drawback has been in the weather, which has been wet and cool, and we are now going through a spell of it that our English friends would certainly call "nasty." It has rained for days with an air of easiness that we do not often see in this dry climate, and the country is literally soaked in water. Small grain is to a considerable extent exposed in the shock and will be damaged. The corn is also largely ready for the harvester, but the fields are in such condition generally as to prevent the use of machines, and frost is feared before the crop, which is a very fine one, can be harvested. A few days of sunshine are greatly needed. Crops have turned out better than expected, and if they can be saved, even in present condition, the country will be in good shape.

NOTES ON PRICES.

Wire Nails.—The condition of the market continues encouraging, demand showing an increase from week to week. The tone of the market is steady at the following quotations, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$2.00
Retailers, carload lots	2.05
Retailers, less than carload lots	2.15

New York.—Local business up to the present time in September has proved satisfactory under existing labor troubles. Store business has been fair, and orders from out of town merchants have been for moderate lots, but frequent, and accompanied by requests for prompt shipments. Quotations are as follows: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—Nearly all the mills are running double turn, with liberal orders received for early shipment and some difficulty met in obtaining cars promptly for transportation. Specifications on old contracts continue more than ample to keep the mills busy, and the tone of the market continues firm, sales being made at $2.15 to $2.20 in carload lots, f.o.b. Chicago, the inside price to jobbers and the outside to retailers. Less than carload lots sell at 5 to 10 cents higher. For galvanizing 75 cents per keg and for tinning $1.50 extra per keg is charged.

Pittsburgh.—There is a fair volume of new orders in Wire Nails, and some of the mills are shipping out their product almost as fast as made, and have commenced to draw on stocks. Prices are being fairly well maintained, and the tone of the market is firm. We quote $2 in carloads to jobbers, $2.05 in carloads to retailers, and $2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails $1.50 per keg extra.

Cut Nails.—The demand is moderate, and supplies at mill are sufficient to fill all requirements. Quotations are as follows: $2.15, base, in carloads, and $2.20 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

New York.—Cut Nails are in steady demand, and continue to be ordered in about the usual proportion. Quotations for carloads and less than carloads are as follows: Carloads on dock, $2.29; less than carloads on dock, $2.33; small lots from store, $2.40.

Chicago, by Telegraph.—The moderate volume of orders being received for Cut Nails are readily billed, stocks being ample and mills not pushed with business, but prices remain steady on the basis of $2.30 in carload lots and $2.35 for less than carload lots for Steel, Chicago. Iron Nails are quiet, but the supply is only moderate and sales are made at $2.45 to $2.50 per keg from store.

Pittsburgh.—There is a fair demand for Cut Nails, and prices are fairly steady. It is intimated that some of the makers are in favor of a reduction in prices at the next meeting of the Cut Nail Manufacturers' Association. We quote Steel Cut Nails, $2.15, base, in carloads and $2.20 in less than carloads; Iron Cut Nails, $2.25, base, in carloads and $2.30 in less than carloads, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—A liberal amount of business is reported by the mills, orders received this month showing an increase of those received in August. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.30	$2.60
Retailers, carload lots	2.35	2.65
Retailers, less than carload lots	2.45	2.75

Chicago, by Telegraph.—Shipments on old contracts are being urged forward by consumers and new business continues liberal, keeping the mills running double turn and preserving the strong tone previously noted. Galvanized Wire is selling on the basis of $2.75 to $2.80 in carload lots, and Painted at $2.45 to $2.50, the outside price being to retailers. For small lots 5 to 10 cents extra is charged. Staples in carload lots sell as follows: Plain, $2.30 to $2.35, and Galvanized, $2.70 to $2.75, the outside price being to retailers.

Pittsburgh.—From Western sections of the country there is a fair demand, but the Eastern markets are somewhat quiet. Outlook for a heavy fall trade is regarded as very encouraging. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.30; Galvanized, $2.60, in carloads to jobbers;

Painted, $2.35; Galvanized, $2.65, in carloads to retailers; Painted, $2.45; Galvanized, $2.75, in small lots to retailers.

Smooth Fence Wire.—Jobbers and consumers are placing orders quite freely, and shipments are being made promptly for stock at the mills. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.90
Retailers, carloads	1.95
Less than carloads	2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—The capacity of the mills is well sold and specifications on contracts are coming forward liberally. The demand for Wire Fencing of various kinds is especially active, but all Fnished Wire Specialties are active. The market continues firm in tone, prices being as follows: Nos. 6 to 9, $2.05 to $2.10 in carload lots on track, and $2.15 to $2.20 in less than carload lots from store; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

Pittsburgh.—A fair amount of tonnage is being placed by jobbers and a good fall trade is expected. The mills have heavy stocks and are prepared to fill large orders very promptly. We quote: Plain Wire, $1.90, base, for Nos. 6 to 9 in carloads to jobbers, $1.95 in carloads to retailers and $2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

Steel Goods.—The associated manufacturers of Steel Goods are announcing prices for next season. The same general scheme of list prices and discounts as were in use last season will be adhered to, but a slight reduction has been made in most of the base discounts, and the extra discounts given to the two classes of the jobbing trade are also slightly reduced, making an advance of about 5 or 7½ per cent. on the opening prices of last season. We give below the base discounts of the Geneva Tool Company, for whom Underhill, Clinch & Co., 94 and 96 Chambers street, New York, are agents:

Hoes.

	Discounts.
Columbian, Field and Washington County	70 and 10 %
Meadow and Rhode Island	75 %
Ladies', Boys' and Toy	70 and 12½ %
Onion, Turnip and Nursery	66 2-3 and 12½ %
Street and Mortar	70 and 10 and 10 %
Blackland or Southern Meadow	75 and 5%
Geneva Planters'	75 and 12½ %
Straight Shank Planters	75 and 10 and 7½ %
Mississippi Planters'	75 and 10 and 7½ %
Geneva Cotton	70 and 10 and 10 %
Ladies' Cotton	75 and 7½ %
Cotton Chopper	75 and 12½ %
Rough and Ready Cotton	75 and 10 %
Weeding Hoes	66 2-3 and 15 %
Turf Edgers	50 and 15 %

Hooks.

Potato Hooks	60 and 15 %
Manure Hooks	60 and 15 %
Stone, Hop and Clam	60 and 10 %

Rakes.

Garden and Gravel	70 %
Weldless Garden	75 and 15 %

Forks.

Two-Tine Hay and Boy	50 and 10 and 5 %
Three-Tine Hay and Boy	60 and 5 %
Sanford Pattern, Two and Three Tines	50 and 10 and 5 %
Four-Tine Hay	66 2-3 %
Long Three-Tine, Grain, &c	65 %
Long Four-Tine Header, &c	65 %
Alfalfa, Deep Dish Header	65 %
Three-Tine Baler	65 %
Four-Tine Baler	65 %
Barley and Grain	60 and 20 %
Geneva Champion Hay	66 2-3 %
Geneva Champion Manure	60 and 15 and 2½ %
Geneva Champion Header	65 %
Four-Tine Manure	60 and 15 and 2½ %
Five and Six Tine Manure	66 2-3 and 2½ %
Spading Forks	70 and 2½ %
Potato Digging	60 and 10 %
Baling Press	60 and 12½ %
Stable and Fish	50 and 10 and 5 %

Shot.—As a result of the strength of the Lead market a further advance has been made in the price of Shot, which is now quoted as follows, terms net cash, 30 days, or 2 per cent. discount for cash in ten days:

	25-lb. bags. Per bag.	5-lb. bags. Per bag.
Drop Shot, sizes smaller than B	$1.60	$0.37
Drop Shot, B and larger sizes	1.85	.42
Buck Shot	1.85	.42
Chilled Shot	1.85	.42
Dust Shot	2.25	.50

Carriage Bolts, Machine Bolts, &c.—This is one of the lines which continue in an unsatisfactory condition, so far as prices are concerned. This is a good deal of unevenness in quotations, and the tone of the market is not at all strong. The low prices which are ruling are, however, inducing some of the large buyers to consider the advisability of placing orders soon.

Wrought Pipe.—The market for Wrought Pipe is fairly well maintained in the matter of price, but there is a slight shading of former quotations. The demand has fallen off somewhat, and there is evidence of a disposition on the part of manufacturers to secure orders.

Nuts.—The manufacturers of Nuts are making slight concessions on prices which recently have been ruling. The volume of business is referred to as fair but not especially heavy.

Cordage.—New business is generally a little quiet with manufacturers, more so with some than with others, while shipments on old contracts are being made to some extent. Manufacturers deplore the fact that a demand has arisen for a second quality Manila Rope, because of the high price for the high-class article, and that to hold customers they are obliged to make it on order. This, of course, provides an outlet for the accumulation of dark, weak and towey Manila fiber which is left on the manufacturers' hands as not being suitable for first-class Rope. Not infrequently other fibers are mixed with this stock. Some jobers sell it at a lower price without calling it pure Manila. This low grade of Rope can usually be distinguished from pure Manila by its darker color. Prices on pure Manila are generally quoted by manufacturers at 12 cents per pound. Second-grade Manila usually sells about ½ cent per pound less. Pure Sisal is held at 9 to 9½ cents and Mixed Sisal at 8 to 8½ cents per pound. These prices are on the basis of 7-16 inch diameter and larger, and are subject to a rebate of ½ cent per pound in large quantities. The prospect of a large cotton crop has brought prices of Cotton Cordage for future delivery to lower figures than have been ruling. Some mills are contemplating starting up in the near future to supply the demand for goods, even at the present prices of cotton.

Spirits Turpentine.—High prices prevent extensive buying, the local market being influenced by that of Savannah. The impression is quite general that the Southern market is not entirely free from speculative features. Quotations, according to quantity, are as follows: Oil barrels, 59½ to 60 cents; machine made barrels, 60 to 60½ cents per gallon.

NEW YORK STATE ASSOCIATION OF RETAIL HARDWARE DEALERS.

A MEETING of the directors of the New York State Association of Retail Hardware Dealers was held in Rochester on the 10th inst. The attendance was very gratifying, nearly every official being present, a fact worth noting in view of the representative character of the gentlemen having under their care the direction of this association. A report from the secretary was read, in which reference was made to the work of the association since the last meeting. There was also a general exchange of views and a better understanding was had of the business or financial end of the association. Great interest and enthusiasm in the work was manifested. The question of securing new members was discussed, and a plan of dividing the State into counties and canvassing in that fashion was considered. The following committees were appointed: Auditing: L. J. Ernst, chair-

man; W. T. Olin, O. D. Towne. Reception: John Sage, chairman; H. H. Maxson, J. W. Ross, Louis J. Ernst. Press: J. B. Foley, chairman. Programme: C. P. Sherwood, chairman. Messrs. Foley and Sherwood will select the members of their committees.

The following gentlemen were present at the meeting: W. D. Hollowell, Penn Yan, president; John G. Ferres, Johnstown, first vice-president; C. P. Sherwood, White Plains, second vice-president; J. R. Taylor, Little Falls, secretary; F. E. Pelton, Herkimer, treasurer; Geo. B. Allen, Buffalo; Louis J. Ernst, Rochester; H. M. Contryman, Potsdam; Geo. W. Rockwell, Horseheads; Charles Hills, Oneonta; W. T. Olin, Perry, directors.

APPLICATIONS FOR EMPLOYMENT.

EVERY employer of labor receives more or less applications for positions, some from skilled craftsmen and others from ordinary laborers. A record should be kept of all such applications in such a way as to be quickly and easily referred to. Out of the large number of applications always on file in the superintendent's office of any large concern, there is always a certain percentage of good material, and this is just what the wise employer wants to keep track of. In many cases when a vacancy occurs, especially in the case of skilled help, such as machinists, draftsmen, &c., there is no available material to replace the man who has gone. There may have been applications for just such a position, some of them from good men, but the scrap of paper on which a memorandum was made of their application cannot be found, or if the application was by letter the man's name cannot be recalled.

The writer has developed a simple, inexpensive and effective method of keeping a record of these applications for work. For purposes of illustration: Take the business of a large manufacturing concern, employing ma-

Adams John W.

Date	No.	Class	Remarks	Disposal
6-25	79	B	Called 7-2.	Hired
			Good appearance.	7-15-03
			Served recommendation	@ 2.50 p. day
			Conducts desirable man	

Application for Employment Card.

chinists, &c. Each department or class of labor is provided with a stiff manila folder, size 10 x 12 inches, and marked on the outside with the class of work and a letter for quick location of the proper folder, as follows: Machinists, A; Pattern Makers, B; Draftsmen, C; Laborers, D; Apprentices, E; Office, F. This list may, of course, be enlarged to cover any other class desired.

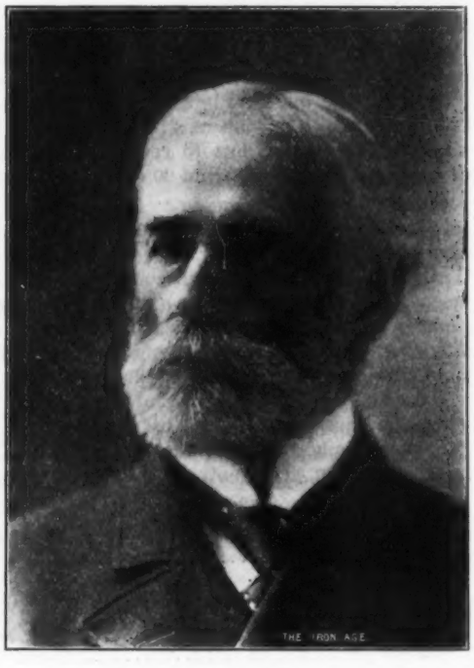
The list of letters and their class will be quickly memorized and the proper folder at once located. This will enable the superintendent readily to locate applications for a certain class of work in which there occurs a vacancy. If he wants a machinist he simply requests his assistant to hand the applications from machinists, and the clerk immediately takes it from the pile of folders and hands it to the superintendent. All the applications are together, and filed with reference to the date, so that the rule of priority may be observed if it is desirable to do so. In addition to this there is another means of locating a certain application—by means of a man's name. For this purpose a card index is used, the card being filled out, as shown herewith. Each application is numbered when filed, for assistance in locating when using the card index.

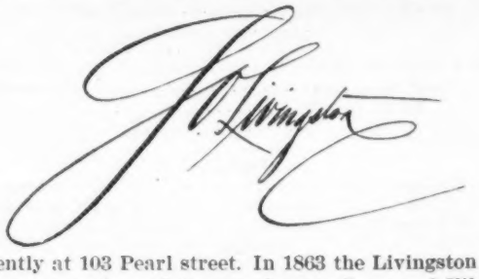
Applications made in person should be supplemented by a written one in every case, and the foreman's or superintendent's comments as to impression made by applicant or any further particulars not mentioned in written application. This rule of written applications should be enforced rigorously, if the value of the system is to be preserved. All applications that have been acted definitely upon, the man hired or the application withdrawn, &c., should be transferred to a permanent file so that the folders may contain nothing but live matter.

DEATH OF S. OTIS LIVINGSTON.

S. OTIS LIVINGSTON, proprietor of the Livingston Nail Company, New York, died Monday morning, September 21, at the Ocean House, Watch Hill, R. I., where he had been spending the summer.

Mr. Livingston, one of the oldest of the prominent New York Hardware merchants and manufacturers, and who was actively engaged in the conduct of his business until the latter part of last July, was born in Johnstown, N. Y., in 1826. For many years he was associated with his brother, W. H. Livingston, who was the senior member of the old house of W. H. Livingston & Co. His elder brother entered the establishment of Palmer, Elliott Huntington & Co., New York, as a boy in 1837, and early in 1838 started in business for himself jobbing goods for cash in Cedar street. By his industry and business ability he established a growing business, and in 1849 admitted S. Otis Livingston, who had been his clerk since December, 1844, to partnership, under the firm name of W. H. Livingston & Co., then at 227 Pearl street, and sub-





sequently at 103 Pearl street. In 1863 the Livingston Mfg. Company was formed to manufacture Saws and Files, at Johnstown, N. Y., W. H. Livingston going there to assume charge of the factory, and where he still resides in good health at the age of 87, although long out of business.

The manufacturing business introduced a new element in the Livingstons' affairs of a financial character. Two gentlemen named Daly, who were rich, were instrumental in getting the Livingston brothers into the manufacture of Horse Nails. The Dalys had been connected with various large enterprises, one of which was the building of the Windsor Hotel on Fifth avenue, burned down a few years ago. The Dalys had loaned some money to an uncle of theirs with which to conduct experiments in connection with a Horse Nail machine, and with which he commenced making Nails at a little place called Forge Village, Mass. They induced S. O. Livingston to join them in a little company called the Forge Village Horse Nail Company, of which John Daly

was president, S. O. Livingston secretary, and A. H. Caryl, superintendent.

After a few years the Livingstons sold out their entire interest in the Forge Village Company and took charge of selling that company's entire product. Mr. Livingston selected patterns that commended themselves to him, and generally looked after the marketing of the Nails. The company continued to make Nails for a number of years until the Globe Nail Company got into the market with their pointed Horse Nails. That method of making a pointed Nail relegated the old methods to the wall, and forced all the old companies out of that style of Nail making. The Putnam Company abandoned the manufacture of the old kind of Nail, and Mr. Putnam succeeded in producing a pointed Nail which was a strong competitor of the Globe Company. The Livingstons, however, did not succeed in getting around the Globe patents, and the Forge Village Company had to give up, as did the other competing interests. The pointed Nail secured the orders, was better, cost less and revolutionized the trade. During this period S. O. Livingston had gotten substantially all of the corporation and railroad business in New York, Boston and Philadelphia, and many of the Western cities, making a specialty of corporation trade. As Mr. Livingston now had no one to supply goods of this character, an arrangement was perfected with the Putnam Company by which Nails were made for him under the brand of S. O. Livingston. Mr. Livingston was afterward general agent, and sold a large quantity of this class of goods for many years. Later he became the agent of the Globe Nail Company, although he was selling the Putnam product at the same time.

For a period he was the agent of the Vulcan Nail Company, technically the Fowler Nail Company, for New York and Pennsylvania, having the entire trade except that of one Philadelphia concern. At the same time he was selling agent for the Essex Nail Company, a concern started in Essex, N. Y., about 1875, keeping at the same time all the other agencies. Then he took over the selling agency of the New Haven Nail Company, New Haven, Conn. Finally the New Haven Nail Company sold out the business, the Nail machines going to Sweden, Mr. Livingston purchasing their stock on hand, and continuing that brand as one of their most prominent to the last.

Nearly 20 years ago he took the entire agency of the Gautier Department of the Cambria Iron Company for all goods made for the territory covered by New Jersey, New York, all New England, the Pacific Coast, and the South—a business he built up from $250,000 to $1,250,000 a year. This contract was with S. O. Livingston, but George Smith managed the business entirely until his death some years ago.

While selling Cambria goods he sent a Toe Calk machine to the Cambria Works, Johnstown, Pa., to manufacture Toe Calks, and they are still making them. Mr. Livingston also took the product of Horse Nails made by the Standard Horse Nail Company, New Brighton, Pa., selling a large part of the Nails made up to January 1, 1903. About two years ago he negotiated with the Coleman Horse Nail Company, Pawtucket, R. I., who built special machinery to make the Livingston brands.

During the period of Mr. Livingston's business life many changes have occurred in the conduct of business. Originally the goods were taken into the New York store and reshipped. As time passed and the business grew in volume and the percentage of profit decreased, he began to take orders to be shipped direct from the factories, much to the amazement of other New York merchants, who marveled at his revealing the ultimate destination of goods to the people making them. Ever since he has done business alone he has carried it on on a five days' basis, paying in cash on the 10th, 20th and 1st of each month. For 35 years he has been the representative of Heller Bros., Newark, N. J., manufacturers of Rasps and Files, and for several years has marketed some of the Anvils made by the Hay-Budden Mfg. Company, Brooklyn.

Personally Mr. Livingston was of a genial and winning disposition, generous in his dealings with the firm's employees, some of whom he made his business confidants, consulting with them as occasion required, and quick to recognize and reward business merit. He was a man of inflexible integrity and sterling character, and he will be mourned by a host of business and social friends. He was a trustee of the United States Savings Bank, director in the Lafayette Fire Insurance and the Madison Avenue companies, and a member of the Hardware, Union League and Tuxedo clubs. He is survived by a widow and one married daughter. The funeral was from his late residence in New York, Wednesday morning, the interment being in Greenwood.

ASSOCIATION ACTIVITIES BETWEEN MEETINGS.

BY H. C. W.

THIS subject has been a problem—than which there is no greater—at almost every annual meeting of the various State associations. It can be largely solved, but the greasing of the wheels is not thorough enough at these gatherings to spread and keep going throughout the interested body during the twelvemonth which follows. Every member of an association is gratified that you have taken the matter up, and so fully gone over the necessities as is done in your issue of August 27. Lack of continued interest is the drawback, the stumbling block to growth and membership in every existing association. It is the cause of nearly as many lapses as there are new members gained at each annual meeting. It is imperative that we do not forget the good that has been done, that is being done and that can be accomplished throughout every month of the 12.

An Example

of what life and vigor may be put into and kept alive in association work is readily recalled by the writer in his own affiliation. Ours was the first among retail organizations, but extremely slow in growth; in fact, had fallen behind nearly all others at the end of the third year, and it became a vital question with officials and the Executive Committee as to what course to pursue toward increasing the membership and keeping the interest alive. The two years following were under the leadership of the writer, the membership being barely beyond the half hundred; and this in the most populous Hardware State in the Union. We could not, however, go backward and down hill. It took money, which we did not have, to progress, but progressing would bring the necessary funds, and at a "desperation" meeting of the committee it was decided to put in a year's hard work to create and keep up interest, to make our membership second to none.

What Was Done

was this. Every old member of the association pledged himself a committee of one to add one or more new members. This result was very much more than averaged at the end of the year. The real work done during that year was the writing of a letter, personally, to every one of the 1300 Hardware merchants in the State; and this was done four times during the 12 months, the last in particular inviting membership, and urging the attendance of merchants at the annual meeting whether they joined us or not. The first and last letters were sent as coming direct from the secretary, the second one signed by every member of the Executive Committee; the third one was a personal appeal from the president.

The Results

were something wonderful, and more than we felt we had any right to expect. Letters and queries came from all parts of the State. Memberships came more slowly, but they came, and at the meeting we had nearly 600 Hardwaremen, instead of the handful of previous years. At the close of that meeting our roster showed something like 425 members, as against an actual count of 63 for the year gone by. It took work—hard work—but the results were so eminently gratifying it paid for all. The interest was not all created by the letter writing, either; much of it was the individual reminder; more of it came through the traveling representatives of various jobbers, who have been good friends of the organization movement in every State in which an asso-

ciation has been established. At the meeting above one salesman, who was not a member himself, handed in the names of six good merchants, all of whom are still enrolled.

Interest can be created and can be kept up, but to keep it up means the continual and necessary work back of it—means individual and collective help, the help of the trade journals. If the writer remembers correctly all four of the letters spoken of here were published in full in the columns of *The Iron Age*, making a feeder for other State meetings as well as our own.

The Time is at Hand

and imperative for the creation of interest and a very large adition to membership lists. It is imperative for the reason that if interest cannot be created and continued in prosperous times it certainly cannot be in those times which are said to be a part of the cycle, and when it becomes a problem to bring the ends together. Then, too, men will always listen in the day of good markets and good profits as they will not at any other time. When we stop to think of it, there are many States that are not even organized as yet, and in those which have associations there is not one that can show a membership of one-half its merchants. This is not as it should be, and almost any effort to create interest should bring a great change.

Feasible Plans

for creating sentiment seem hard to get at, and yet I believe every meeting of officials or of the Executive Committee would bring about profitable suggestions. It is not possible for an association to meet oftener than once a year, but it is possible and profitable, no matter what the expense, to bring seven or eight members of the Executive Committee together at least once a quarter, if for no other purpose than the one in hand. The fact, too, that nearly all these meetings (annual ones) are held in February would suggest this as the proper time for an "interest creating" campaign. We are now at a point where, in connection with the National Association, we are representative, aggressive and influential. To become more so needs but the creative interest you suggest and the constant additional membership list.

We All Forget

and are bound to lose interest and enthusiasm unless occasional prompting offers from headquarters. General interest should be created by a universal desire to see each association become larger than the previous year. A letter at this time to all who are willing workers, whether officials or not, would stir them up to greater efforts toward the coming meetings. Another or a postal card reminder to every member on the roster, that he is expected to help make the next meeting better and larger than the last would not come amiss. "What has been accomplished by associations?" is often asked by those who are not members, and on the answer hinges their interest and often a membership. A circular letter to this effect, mailed once or twice a year, to both members and nonmembers, would certainly create and keep up interest.

The Trade Journal

in its discussions of association matters can create and keep up as much general interest as possibly any source. As before remarked, the fact of your publication having taken the matter up at this opportune time will probably set every interested member to wondering how best he can help in that which will be absolutely necessary to the future existence of such organizations. Each one of us is familiar with the work done, not only at his own State meetings, but with that done by all the other States, through the medium of the trade journal. It is watched for and carefully gone over, the papers read, comparisons made; subjects and authors are not forgotten; improvements are often made in methods as a result; a vast amount of correspondence, one merchant with another has come about. The hard part of it is that this does not last throughout the year, and ways must be found to make the interest a lasting one. Would it not be a good idea to

Get Nearer Your Officials,

use them as often as possible, consistent with your needs and wants? They are there to help out when called on and are glad to do it. It keeps us closer to them and to the association, and gives us an interested set of merchants. Many of us have matters come up that should go to headquarters, which, through our own neglect, never reach there. Complaints that are of any value whatever should go to our secretary for record and investigation. Inquiries as to what is right and what is wrong are always gladly received and replied to. We cannot keep up interest by asking questions and telling our woes at the end of the year, months after it would do us any good to have an answer or to make complaint.

Insurance is a Magnet

toward the keeping up of interest, and perhaps has proven a stronger one in our own association than any other that might be mentioned. From its first suggestion until the final organization of the company there was constant inquiry and question, not only at headquarters, but one member with another. For the two years past it has been the greatest among the ties that bind, and I believe will always continue to be a source of great interest. When the association touches a man's pocketbook it invariably becomes a matter of vital interest, particularly if success attends. The insurance matter, so far, has proven profitable wherever a company has been organized. Every member is interested in seeing his fire guarantee a sure one, in knowing that the right men are at the head, this year and in the years to come. Perhaps this one thing of all others will prove the straw that binds the clay in the brick.

The association is meant to be

A Help in Business.

It must be either that or be nothing to us in the course of time. There is too much to be gained in gatherings of this class to feel that there is but once a year to make friendships and to gather the good seed that comes from association with hundreds of the best business men in your State. Local associations have resulted in many towns and cities, through the medium of the State gathering, and where they are not they certainly should be, as no one thing serves so well toward keeping in touch with the parent associations. We hope to hear many suggestions from many localities. Let us not only think it over, but talk it over; talk to your traveling friend, he sees your next door neighbor and talks with him. No one is in better shape to foster interest in your association. He much prefers to see it kept up. There are but four or five months before the annual meetings begin. It is a good time to renew our good fellowship, to find out if we are doing our duty toward ourselves and our associated interests. It we haven't done it, let us at least start another year right.

CARRIAGE BUILDERS' NATIONAL CONVENTION.

THE thirty-first annual convention of the Carriage Builders' National Association is now being held in Boston, Mass., the deliberations and social features occupying the entire week, September 21-27. The sessions are being held in Paul Revere Hall, Mechanics' Building, the headquarters of the association being at the Hotel Brunswick, though, of course, quite a number of the great body of delegates are quartered at other well-known hostelries. On Monday morning the annual exhibition of parts of Carriages, Wagons and Automobiles, Gears, Wheels, Springs, Axles and materials used in their construction, harness, horse equipments, &c., was opened in the great hall of the Mechanics' Building.

FIRE broke out on the night of the 12th inst. in the main store and office building of the Barney-Cavanagh Hardware Company, Mobile, Ala. The fire was, however, confined to the second, third and fourth floors of the establishment, and goods in their warehouses were not damaged by either water or fire. The loss is fully covered by insurance. The fire occurred on Saturday night, and by Monday morning arrangements had been effected with the insurance companies by which the company were permitted to go ahead with their business without any interruption whatever.

FACTORY COST SYSTEMS.

DESCRIPTION OF SYSTEM USED BY ENTERPRISE MANUFACTURING CO.

Second Article.

The first article, which was published in The Iron Age September 17, gave in connection with other information in regard to the business management of the factory of the Enterprise Mfg. Company, Philadelphia, an illustration of Descriptive Card, Fig. 5, which is the official record of details of construction of all articles manufactured by the company, and gives the job numbers of all parts of such articles. As the basis of the cost system it is referred to in the following detailed description.

JOB NUMBER CARDS FOR EACH PART.

Cards giving the job numbers for each operation on each part of every article manufactured are kept in the

SAD IRON BOTTOM SIZE 1-#50 PART #1235

Operations	Job Numbers
Moulding	
Grinding Face	2163
Grinding Edge	2164
Drilling	2165
Tapping	2166
Polishing Rough	2167
Polishing Second	2168
Polishing Color	2169
Polishing Oil	2170
Nickling	9264
Buffing	8742

Form 3

Fig. 10.—Job Number Card Giving Job Numbers for Each Operation on Part No. 1235. Size of Card, 3¼ by 5 Inches.

engineering department. The job number card referring to Part No. 1235, the bottom of Sad Iron, size 1, No. 50,

Job No. 2163
Name of Article SAD IRON #50 SIZE 1
Name of Part BOTTOM
No. of Part 1235
Nature of operation GRINDING FACE
Standard Product per ¼ hr. 25
Value of one Piece in ¼ hrs. of operatives time 1.12
Pay of operative per ¼ hr. 4.4
Dept. where work is done 18
Form 15-D

Fig. 11.—Job Number Index Card Giving Detailed Information in Regard to the Operation to Which it Relates. Size of Card, 3¼ by 4 Inches.

as per Descriptive Card given in our last issue, Fig. 5, is reproduced herewith, Fig. 10, in which the different operations in its manufacture and the numbers by which such operations are designated are given. From this card it is seen, for example, that the operation of grinding the face of the Sad Iron is known as Job. No. 2163.

JOB NUMBER INDEX CARD.

There is also for reference a job number index card, giving particulars in regard to each operation. One of these relating to Job No. 2163, the grinding of the face of the bottom of Sad Irons, No. 50, is reproduced herewith, Fig. 11. It will be observed that it is based upon the descriptive

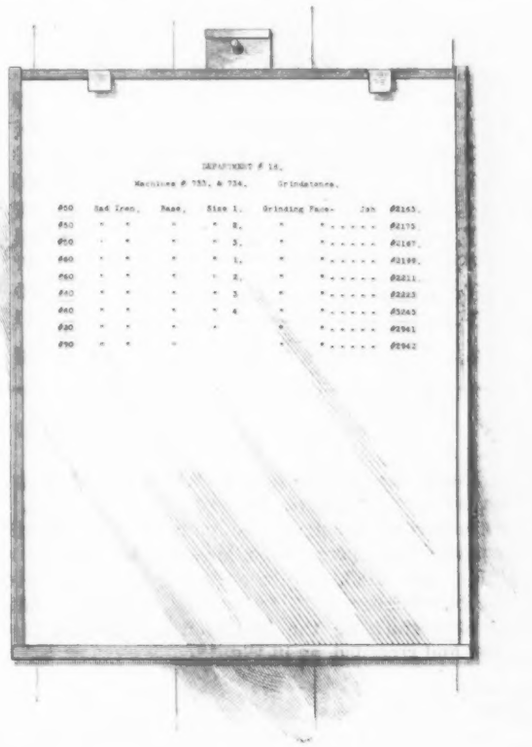


Fig. 13.—Job Number Charts Posted in Plant for Information of Workmen.

card reproduced above, Fig. 5, but gives in detail particulars concerning the part in question and the work upon it. It is thus noted that the standard or expected production in the operation in question is 25 per quarter hour, in accordance with job number book, Fig. 12.

ARRANGEMENT OF JOB NUMBER BOOK.

In order to furnish a standard for each operation, the job number book gives in connection with the number and name of each operation the number of pieces expected per quarter hour. The arrangement of this book is indicated in the accompanying illustration, Fig. 12.

CHARTS GIVING JOB NUMBERS.

Each operation throughout the works being given a job number, as explained above, charts for the information of the operatives are provided in convenient places where the operations are performed, giving these numbers. One of these charts posted up is reproduced

JOB NO.	TASK FOR HOUR		PREMIUM		PENALTY	ARTICLE	PART	NATURE OF OPERATION
	PIECES	POUNDS	PER 100	PAID	DEDUCT			
2163	25		5.		4.9	Sad Iron #50-1	Base #1235	Grinding Face
2164	10		13.		5.3	Sad Iron #50-1	Base "	Grinding Edge
2165	45		3.		6.1	Sad Iron #50-1	Base "	Drilling
2166	35		4.		6.5	Sad Iron #50-1	Base "	Tapping
2167	6		21.		6.7	Sad Iron #50-1	Base "	Polishing Rough
2168	20		7.		8.1	Sad Iron #50-1	Base "	Polishing 2nd Face
2169	25		5.		8.5	Sad Iron #50-1	Base "	Coloring Face
2170	15		9.		8.7	Sad Iron #50-1	Base "	Oiling

Fig. 12.—Job Number Book Giving Standard of Production for Each Operation or Job Number. Size of Page, 9 by 12 Inches.

herewith, Fig. 13. From these charts the workmen learn the number of each operation and are enabled to make proper entries on time slips.

ASCERTAINING MANUFACTURING COSTS.

It is now proposed to follow a piece of work through the various stages of manufacture. The work selected thus to illustrate the details of the system is the grinding of the face of the bottom of a lot of Mrs. Potts' No. 50

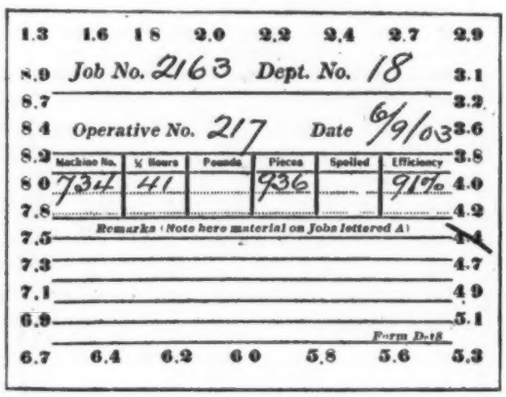

Job No. 2163
Dept. No. 18
Operative No. 217
Date 6/9/03
Machine No. | ½ Hours | Pounds | Pieces | Spoiled | Efficiency
734 | 41 | | 936 | | 91%
Remarks (Note here material on Jobs lettered A)
Form D-18

Fig. 14.—Regular Time Slip. Size of Slip, 3 by 4 Inches.

Sad Irons, size 1. The part on which this work is to be done, as per descriptive card, Fig. 5, is No. 1235, which does not change, but is the permanent designation of the part. The operation of grinding the face is known as Job No. 2163. In the descripton which follows this job number will frequently reappear, until the cost of performing the operation in question is ascertained and recorded, as in Fig. 18.

FORM OF TIME SLIPS.

Each employee is given a tablet of time slips which he uses, one for each operation he performs. These slips are printed forms, as shown in the accompanying illustration, Fig. 14, which represents a part of the record in connection with grinding the face of the No. 1 Sad Iron, the cost of which is being ascertained.

The operative is required to fill in the job number which he obtains from the chart, Fig. 13, the number of the department, his own number, the number of the machine on which he worked, the quarter hours he worked, the number of pieces finished, and the number spoiled. In this case it will be seen that the work reported on the slip represented in Fig. 14 was in department No. 18, the grinding and polishing department; that the grinding of the face of the Sad Iron, Job No. 2163, was done on machine No. 734, and that in 41 quarter hours' work 936 pieces were ground. It is sometimes found desirable to calculate the efficiency of the workman. This is done by comparing the number of pieces done by the workman in a given time with the standard given in job number index card, Fig. 11, which shows that in this operation 25 pieces are expected as the result of each quarter hour's work.

Each foreman is required to collect and check these slips and forward them daily to the record department. Here comparison is first made with time keeper's clock record to see that all time recorded by each operative is accounted for by slips.

On the margin of the time slips are printed figures in cents and decimals, which indicate wage rates per quarter hour, the record department being furnished with a card of operatives' numbers giving the wage rate of each operative in quarter hours, indicates by a pen scratch through the corresponding number on the margin of the time slip the wage rate of the operative. It was found necessary to adopt this plan owing to the many

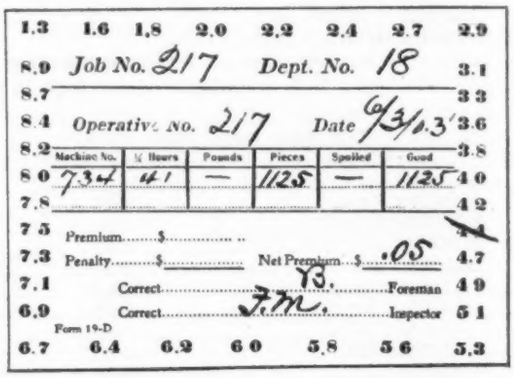


Fig. 16.—Premium Time Slip, on Colored Paper. Size of Slip, 3 by 4 Inches.

changes in operatives' numbers. In this case the wage rate of operator No. 217, as marked in Fig. 14, is 4.4 cents per quarter hour. The form of this record of operatives' numbers is shown in Fig. 15.

PREMIUM AND SUNDAY TIME SLIPS.

In many cases premiums are given for production in excess of the quantities noted in job number book, Fig. 12, and a premium time slip which has paper of a distinctive color is used by the operative. This slip is shown in Fig. 16. In this case the number of pieces per quarter hour expected for the operation in question is 25, but operative No. 217 has turned out 1125, and is accordingly entitled to premium, as indicated.

1	8.9	51	6.7	101	3.1	151	8.4	201	4.9	251	10.0
2	4.4	52	3.1	102	4.4	152	4.4	202	4.9	252	8.7
3	5.3	53	4.4	103	4.0	153	4.9	203	4.4	253	8.0
4	4.0	54	4.4	104	2.7	154	4.4	204	2.7	254	1.6
5	4.4	55	3.1	105	3.1	155	4.9	205	4.9	255	4.2
6	4.9	56	3.1	106	2.7	156	4.9	206	4.9	256	6.7
7	4.4	57	3.1	107	2.7	157	4.9	207	4.4	257	2.0
8	4.9	58	3.1	108	4.4	158	4.9	208	4.0	258	7.3
9	4.4	59	3.1	109	2.7	159	4.4	209	4.9	259	7.3
10	4.9	60	4.4	110	2.7	160	4.9	210	4.4	260	6.7
11	4.4	61	4.4	111	2.7	161	4.9	211	4.0	261	6.7
12	4.4	62	4.4	112		162	4.9	212	4.0	262	8.0
13	4.9	63	4.4	113	2.7	163	4.4	213	4.9	263	
14	2.7	64	3.1	114		164	4.4	214	4.9	264	2.7
15	4.4	65	4.4	115	2.7	165	4.9	215	4.4	265	8.0
16	4.4	66	2.7	116	2.7	166	4.4	216	4.9	266	4.9
17	4.4	67	3.1	117	4.4	167	4.9	217	4.4	267	4.0
18	2.2	68	3.1	118	2.7	168	4.4	218	4.4	268	
				119	4.0	169	4.9	219	4.4	269	

Fig. 15.—Record of Operatives' Numbers Kept in Record Department for Reference.

SUNDAY WORK TIME CARD.

In case it is necessary to do Sunday work a special time slip is used, as shown in Fig. 17.

If an operative works out of his department he is charged up to the department in which he works, as per

Department Loan Report, Fig. 25. The time slips thus show the total work actually done in each department.

From these time slips of all kinds—the regular time slip, the premium time slip and the Sunday work time

1.3 1.6 1.8 2.0 2.2 2.4 2.7 2.9

Sunday Work Card

8.9 3.1
8.7 Operative No. 434 Date APR 5 - 1903 3.3
8.4 Name Hann 3.6
8.2 Charge time to 200 A ¼ Hrs. worked 50 3.8
8.0 4.0
7.8 Signed J. Scholn 4.2
7.5 Countersigned W Thomas 4.4
~~7.3~~ Watchman 4.7
7.1 Form 24-D Foreman in charge of work 4.9
6.9 No payment will be made for Sunday work unless this slip properly filled out is returned to the Record Dept. 5.1
6.7 6.4 6.2 6.0 5.8 5.6 5.3

Fig. 17.—Sunday Work Time Card. Size of Slip, 3 by 4 Inches.

slip—the machine record card hereafter to be referred to and reproduced, Fig. 26, is posted up.

SUMMARY OF TIME SLIPS GIVEN IN SUMMARY CARD.

Time slips are filed under the job number, and at stated intervals totals are made by the aid of a comptometer, and a summary card, as represented in Fig. 18, is made out and filed in place of the slips.

From the entries on the upper part of this summary card it will be seen that the work on the job in question, No. 2163 in Department No. 18, occupied from January 29 to June 26, and in this time 2823 quarter hours were

Job No. 2163 Dept. 18	
Date 1/29/02 to 6/26/02	
Time 2823 - ¼ hrs. @ 4.4	$124.21
hrs. @	
hrs. @	
Premium	
Total	124.21
Proportion room expense	112.92
19 pieces spoiled at 49	.93
Total	238.06
Number of pieces 6394	
Cost of Job per piece .0037	

Fig. 18.—Summary Card of Time Slips. Size of Card, 3 by 4 Inches.

spent on the work, which at 4.4 cents per quarter hour gives the labor cost as $124.21. The manner in which the room expense is determined and charged up against the job will be explained hereafter.

The next article will bring together the different elements of cost, showing the manner in which Room Expense is charged up and the total cost of the Sad Iron in question ascertained.

REQUEST FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM GORDON & ST. CLAIR HARDWARE COMPANY, Doniphan, Mo., who have just started in the Hardware, Stove, Tinware, Agricultural Implement, Sporting Goods, Blacksmiths' Supplies and furniture business. The firm comprises O. H. Gordon, formerly of Mine La Motte, who has been in business at that point for 19 years, and J. H. McClair, formerly connected with the T. L. Wright Lumber Company at Kingbee.

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BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., Sept. 12, 1903.

The Week's Hardware Trade.

TRADE still continues, in the lighter metal goods, distinctly disappointing. This week has been prematurely chilly and windy, with the result that heating appliances and apparatus generally have been in request. But while heating apparatus have benefited by the prematurely cold weather, Agricultural Implements have been slightly adversely affected. In the White Metal and Cutlery branches there are still very serious complaints of depression, although many firms say that business in some directions is on the mend. It is regarded as a somewhat remarkable fact that while the London and principal Midland markets are almost worse than ever, there has been a most welcome and quite surprising improvement in trade with the Southern counties. Some of the travelers in the cities and towns on the coast have sent home far better lines and more satisfactory reports than have come to hand from any other field. In the principal industrial centers, particularly in Lancashire, travelers complain that they have found it next to impossible to effect sales. It was the experience of the representative of a leading house that not one in ten of his customers in Manchester would take the trouble even to look at what he had to show them. In the North of England and Scotland business remains very quiet, and orders are as difficult to book as accounts are to collect. Distributors in all parts are saying that they find it almost impossible to get in their accounts, and in turn they cannot meet their engagements. There is probability that the Christmas season will open later than is now usual, and prospects are not encouraging. One explanation given for this state of affairs is that incomes have been so severely affected by the smallness of the dividends from investments that people have not the money to spend either on presents or articles of luxury.

A manager of one of the large Sheffield firms engaged in the manufacture of Stove Grates and Kitchen Ranges sums up the situation as bad. His firm thought at the end of the second quarter that the bottom had been reached, but during this quarter a lower depth has been sounded. At the present time prospects are far from encouraging. There seems to have been a general stoppage of building, not only in Sheffield and neighborhood but throughout the country, and the demand has been affected for all classes of goods, the most expensive as well as the most common. Most firms have difficulty in keeping their people employed, and are tolerant of holidays.

On overseas account the Continental markets have been a little disappointing, with the exception of Belgium, and Australia still shows symptoms of the exhaustion which naturally followed the evil events of last year. Better orders, however, have come to hand from South Africa, India, Argentina, the Philippines and the Dutch East Indies.

The Tin Plate Trouble.

Up to the last moment it was hoped that the troubles in South Wales would be overcome, and that there would be no stoppage of works. The worst, however, happened, with the result that there are 15,000 workmen idle at a sacrifice of £20,000 a week in wages. The situation, however, while bad enough, is not so serious as in many strikes. During the week a meeting was held of representatives from the various unions affected by the strike.

English Marking on Foreign Guns.

Birmingham is just now in the throes of a keen discussion as to the marking of foreign Guns with the British mark. This discussion reveals a state of things which can hardly be flattering to the pride of Birmingham. The industry is one with which the name of Birmingham has always been associated, and until recent years manufacturers of the great Midland city provided the world with Guns. At the present time their reputation for the manufacture of the best class of Sporting Guns is maintained. Sportsmen of means, not only in England but in America and other foreign countries, are as ready as ever to pay a fancy price for Firearms bearing the name of one or other of a few Birmingham makers with a reputation. The city also holds its own in the military branch; in fact, during the recent war new records of production were established. In the ordinary trade, however, it would seem that Birmingham manufacturers depend to a great extent on the foreigner, who has also captured a large share of the trade in the commonest and cheapest Guns made.

DISTINGUISHING MARK NEEDED.

The present discussion has arisen out of the fact that the Guardians of the Proof House have under consideration the desirability of making a distinction between the marking of British and foreign made Guns. The proof marks, of course, are a guarantee of the safety of a Gun, and regarding it from this point of view it has been the custom to bestow the same marks on any Guns which passed the test whether they were of British or foreign origin, but, as in the jewelry trade, it is contended that the Birmingham proof mark has attained a significance beyond that of a mere guarantee of safety. It is held that its bestowal upon a foreign made Gun is extremely likely to create the impression that the arm was made in that city, and that this is placing foreign competition on an unfair level with the Birmingham trade. That there is good ground for this contention is to be assumed from the fact that the Guardians of the Proof House propose to introduce a new rule requiring foreign made Guns to bear the word "foreign," or the name of the country of origin, in addition to the proof marks. So far there appears to be pretty general agreement among the Gun makers that for their own protection it is necessary to make such a provision. The dispute has arisen concerning the conditions under which the additional mark shall be imposed.

RIVAL PROPOSALS.

The contentions of the opposing parties may be gathered from the proposed rule and amendment. The original suggestion was that the rule should read as follows: "Every small arm of foreign manufacture submitted for definitive proof which does not bear the full name and address of the maker indelibly impressed thereon shall be accompanied by a declaration in writing stating the name of the country in which the same has been manufactured. Every such small arm shall have impressed thereon, in addition to the proof marks applicable thereto under any of the foregoing rules, a word or words indicating the country in which the same was manufactured, as, for example, 'Belgian.'" To this an amendment was moved to omit the word "definitive," which relates to the final proof, and to add after the word "arm" the words "or barrel." The rule would impose the additional mark only on finished Guns of foreign manufacture, while the amendment would bring within the scope of the new regulations any Gun which had foreign work in it. The whole matter was, however, adjourned for the opinion of the trade to be taken. The Gun Manufacturers' Association has voted in favor of the original rule, while the operatives have decided in favor of all foreign material being so marked.

A DECAYED INDUSTRY.

The matter is not a simple one to decide, however. Doubtless "the man in the street" would at once say that it is hardly fair to put British marks on anything of foreign origin, but the opponents of the amendment say that if it were adopted their trade would be crippled. The plain truth of the matter is that they are to a large extent dependent on imports from Belgium, and therein lies the fact which is so disconcerting to the individual who takes pride in the city's reputation as a Gun making center. During the last 15 years or so Gun barrel making has been a declining Birmingham industry, and at the present time there are not in the city more than two or three makers for the trade—so few, in fact, that they are not in a position to turn out the number of barrels required, and to pass the amendment would be to give them a monopoly which they could not supply without increasing their plant, and during the interval required for extensions the trade affected would be brought almost to a standsill. No doubt every one interested would like to see the Birmingham Gun barrel trade

resuscitated and restored to its former position, but it will be seen that the question has a practical as well as what may be called an ethical side.

THE ROUGH AND THE FINISHED BARREL.

The opponents of the amendment, however, are prepared to argue the ethical as well as the practical side. They point out that the original rule would exclude from the Birmingham proof mark Guns entirely made abroad, and that all they contend for is the right to buy Barrels in the rough, which, owing to the inability of the Birmingham Barrel makers to meet their requirements, are the raw material upon which they are dependent. The rough Belgian Barrel, they say, represents not more than 5 or 6 per cent. of the value of the finished Gun, and after it reaches them there is still considerable work to be done upon it. It first undergoes the provisional proof, and then, if this is passed satisfactorily, the tube has to be bored and milled to the required dimensions and weight. If for a Double Barreled Gun, the tubes have to be fixed together, and the action has to be made and fixed before the definitive or final proof is undergone. The stock has also to be added, but it is obvious that before this is done considerable labor has been bestowed upon the rough Belgian tube, and that the value has been largely increased. From a common sense point of view, therefore, it does not seem altogether unreasonable that the gun maker should claim to regard the finished article as his own production, entitled to bear the Birmingham proof mark without any addition.

The Transvaal from the Inside.

The following extracts from a letter, dated July 15, from Pietersburg, in the Transvaal, are interesting as showing the inner mind of many British colonists in that country. Some of the facts stated here are especially interesting and to the point:

People in England think that South Africa is governed by Lord Milner, but that is quite wrong—everything is governed by the millionaires. If a new mining district opens out they buy up most of the claims, which they neither work themselves nor let others work. Look at the two new gold and diamond laws; absolute robbery of the people, all for the millionaires. The old laws were bad enough, but did give the people a chance of enriching themselves with the mineral wealth of the country. It costs now £144 13s. 6d. direct cash payment to peg out 50 claims for one year, and £90 every year afterward, besides expenses. The Government gets £94 13s. 6d. of that; the restrictions are such that none but the wealthy can take up the ground. Then look at the labor question: These men don't want natives; they want Chinamen, who will work for half the wages. The big men shout out they can't get natives, which is absurd, as there are thousands and thousands to be had (I live among them); but they are very cleverly limiting the number to give color to the statement that there are none to be had. One manager of a mine in Rhodesia (to my certain knowledge) was ordered to sack all his natives, and then raise the cry they could not get labor. The shares went down, were bought up by the interested parties and then this manager was sent recruiting, and in ten days had his full complement of "boys." I live with a native labor agent. He has sent this year 2000 "boys" to the mines, and could send 8000 more from this part were he allowed to do so.

To please and satisfy the public there has been appointed a Labor Commission inquiry into the native labor supply. The men appointed are the big men themselves, who are all in favor of the Chinese. We know beforehand what the result will be—we are being "diddled" as usual. Then again, the Government has allowed the country to be flooded by the British Indian. This is a terrible danger to the white man, who must have decent food, house, clothing and the ordinary wants of civilization. These cost, at the lowest, £15 a month. The British Indian can have all he wants for £2 a month, and as he is placed on an equality in the matter of trade it is only a question of time before he has pushed out every white man here, as they have already done in Natal. As an example, before the war, in Pietersburg there were eight British Indian shops; now there are 64 new shops, all occupied by the British Indian, and the white, not being able to compete with him, must go. One would think the British Government would protect its own white people. They have made laws that the British Indian shall only trade in certain localities, but the laws are not enforced, so are of no use. If the native is allowed to go to the mines, and the Asiatic kept away, there will be room for thousands of English to make a good living. If not—no white need apply.

I am surprised there is such an outcry at Chamberlain's fiscal policy. When I was at home a few years ago I advocated just the same thing. Almost every one here, who hopes for a strong empire and would like to do the home country a good turn, knows that it has to come. People at home don't know what an awful lot of American and German goods are sold here. Why cannot the English have all the trade? We are willing to give them preference, and the people at home need not fear 6d. extra on wheat, for they will get it all back on their goods. Chamberlain is right. What about the time when the colonies will have 100,000,000 of population and England small by comparison? Then she will want preference, and probably not get it, for we shall be on our own. When her trade with the Continent is killed by hostile tariffs, and she loses her trade with her colonies, what will she do? It may seem strange, but we of the colonies are more British than Britain. When we have our own government we are going to make this a colony for Britishers and give the struggling crowds at home a chance, instead of opening our doors (as under the present administration) for the alien from the East, who causes the white man to starve. Both cannot exist in the same land—one must go. Is it to be the Asiatic or the white?

KINDLY RELATIONS IN BUSINESS.

THE relations which exist between employer and employees in the store, have much to do with the success of business. The employer must necessarily take the initiative in this matter, and can do it without loss of dignity or respect.

A Pennsylvania retail merchant attributes a great deal of his success to the kindly relations which have existed between himself and those in his employ. This feeling has been a feature of the business for more than 17 years, and to foster it, each Christmas the merchant has presented each of his men with some token of remembrance suitable to the season, and every year this has been reciprocated by a joint present from the employees.

If the value of kindly relations between the heads and subordinates of business concerns was more generally recognized and fostered, not only for business considerations, but also for higher motives, it is not unlikely that there would be more loyalty on the part of the employees and a correspondingly increased interest in performing their duties faithfully.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers issuing new catalogues or price-lists are requested to send to THE IRON AGE *two copies—one for the Catalogue Department in the New York office, and one for The Iron Age Library of Trade Literature in London.*

MATHIAS-WAGNER COMPANY, Cedar Falls, Iowa: Circulars illustrating the Daisy Automatic Weather Strip for Doors, and the Daisy Automatic Steel Barn Door Latch.

THE IVES MFG. COMPANY, Bridgeport, Conn.: The Ives miniature railway system. Descriptive booklet illustrates Locomotives, Cars, Stations, Bridges, Crossovers, Signals, Tracks, Switches and Track Diagrams. Iron and Mechanical Toys are also made by the company.

FERGUSON MFG. COMPANY, successors to Bellevue Pump Company, Bellevue, Iowa: Illustrated catalogue of Kegler's Patent Galvanized Iron Chain Pump, Curbs and Tubing, all but the latter being shown in different styles. A price-list accompanies the catalogue.

THE PONTIAC TURNING COMPANY, Pontiac, Mich.: Price-list No. 3, relating to High Grade Hickory Handles, including Axe, Adze, Sledge, Pick, Mattock, Hammer, Cant Hook and Hatchet Handles; also Ball Bats, Whiffletree Woods, Neck Yoke Woods, &c.

AMERICAN STOVE BOARD COMPANY, 110 Ontario street, Chicago, Ill.: Illustrated catalogue of Stove Boards for 1903.

William Barron's Hardware stock at Geneva, N. Y., has been purchased by other merchants of the town—namely, William Wilson, Dorchester & Rose and Abraham Hawkins.

BRIDGEPORT HARDWARE MFG. COMPANY'S FIRE.

THE factory of the Bridgeport Hardware Mfg. Company, Bridgeport, Conn., for whom J. C. McCarty & Co., 10 Warren street, New York, are representatives, was destroyed by fire on the night of September 16. The company's officials say this will necessitate only a slight delay in executing orders, as they have already secured a large three-story factory, and will be in operation again inside of two weeks. They will rebuild with enlarged and improved facilities as soon as building conditions will allow, and they express sincere appreciation of the many kind expressions from their friends in the trade. They refer feelingly to business facilities placed at their disposal by brother manufacturers of Bridgeport for repair of machinery, tools, &c., which will aid in their having a stock of new goods ready for the market in a few weeks.

MISCELLANEOUS NOTE.

Bath Brushes.

J. Finley Smith, 118 Chambers street, New York, manufacturer of a general line of brushes for the trade, such as painters' and household brushes, has recently brought out a fine line of bath brushes, which are a combination of strap body brush and curved handle bath brush. They are made with interchangeable handles of a superior quality of stock both as to bristle and woods, there being about 50 different sizes, styles and patterns, suitable for retailing at from 50 cents to $2.50 each. The woods are holly, mahogany and rosewood, and both leather and web straps are used. The backs are securely held by brass screws. The regular curved handle styles are also made in inlaid woods, including rosewood, mahogany, holly, bird's-eye maple and olive, handles and back being continuous strips of wood. He also has a line of double or two-handle bath brushes for scrubbing the lower limbs, and trunk, both back and front, which are entirely new in the trade, we are advised, this style being made of black walnut, bird's-eye maple and satinwood.

Pruning Shears.

The pruning shear illustrated in Fig. 1 is a recent addition to the line made by the J. T. Henry Mfg. Company, Hamden, Conn., for whom Wiebusch & Hilger, Limited, 9 to 15 Murray street, New York, are sole agents. Shears

Fig. 1.—Shear No. 2020.

of this pattern are made with handles varying in length from 20 to 26 inches. The blades are of the best quality of tool steel, carefully forged and tempered. The shears

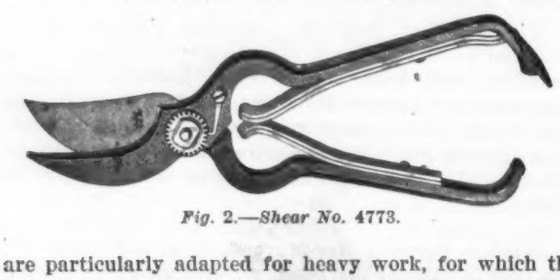


Fig. 2.—Shear No. 4773.

are particularly adapted for heavy work, for which the smaller sizes of hand shears may be considered unsuited. The company make in addition a most extensive line of hand pruning shears. The line consists of patterns adapted to the various kinds of pruning and suited for different localities. The factory has added very considerably to the line recently, and in doing so has brought out a number of patterns of the better grade of shears in small sizes. Such shears go largely to the fruit growing section of the Pacific coast, where pruning shears of high

Fig. 3.—Shear No. 4771.

grade are imperatively needed, and where small sizes are in much favor. The shear shown in Fig. 2 is made in both 8 and 8½ inch lengths, and the one in Fig. 3 in 8½-inch. Both of these patterns are also made in the customary sizes of 9 to 10 inches. The pattern illustrated in Fig. 4 is a shear designed specially for the use of professional pruners. The model is one called for almost universally by those most skilled in such work, who demand an article

Fig. 4.—Shear No. 5775.

of unquestioned quality, constructed for their particular use. The blades of this shear are said to be the finest that can be made, and each shear, in addition to the blade, which is a part of it, is packed with an extra blade. This shear is made only in the 9-inch size. The shear shown in Fig. 5 is also made in but one size, 7½-inch. This pattern is referred to as popular, especially for private use.

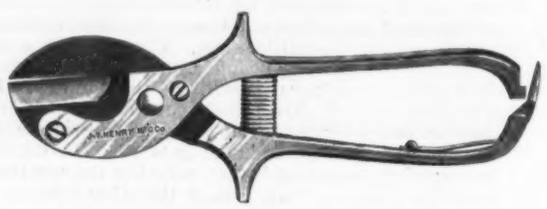
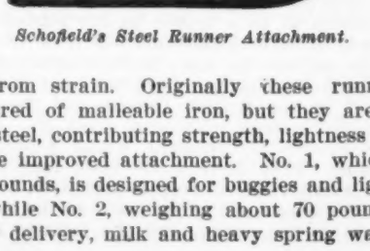


Fig. 5.—Shear No. 750.

These shears are made in both all bright finish and in what is termed "black finish." The line of hand pruning shears as now made covers all sizes, ranging from 7½ to 10 inches, and is very complete.

Schofield's Steel Runner Attachment.

Schofield & Co., Freeport, Ill., are manufacturing a steel runner attachment designed for connection to wheeled vehicles, as shown in the accompanying illustration. The runner is designed to be attached to the square portion of the axle by means of clips, relieving the



Schofield's Steel Runner Attachment.

spindles from strain. Originally these runners were manufactured of malleable iron, but they are now designed of steel, contributing strength, lightness and neatness to the improved attachment. No. 1, which weighs about 60 pounds, is designed for buggies and light spring wagons, while No. 2, weighing about 70 pounds, is intended for delivery, milk and heavy spring wagons.

The Grand Rapids Roller Bearing Sash Pulley.

The Grand Rapids Hardware Company, Grand Rapids, Mich., are manufacturing and just placing on the market a roller bearing sash pulley which they call the

Fig. 1.—The Grand Rapids Roller Bearing Sash Pulley.

Grand Rapids. The prominent features are the roller bearing wheel and the device for attaching to the jamb. As every pulley is made of a standard size, it is necessary only to bore three 1-inch holes in line, centers ¾ inch apart, or to mortise with any pulley mortiser using 1-inch bits, cutting the mortise 2½ inches long. No counterboring for face plate is necessary and no screws are required to hold the pulley in position. Explicit directions for mortising and attaching are given, and punches and sets are supplied to all users. The construction of the wheel is a distinctive feature, Fig. 2 showing six steel rollers, ¼ inch in diameter, which run on a solid steel axle of the same diameter, making a bearing little subject to wear. The manufacturers state that this roller bearing pulley can carry more weight than any sash cord will support. The stock pulleys are made regularly in polished natural steel, but upon special orders can be furnished in gun metal, brass, bronze or antique copper finish.

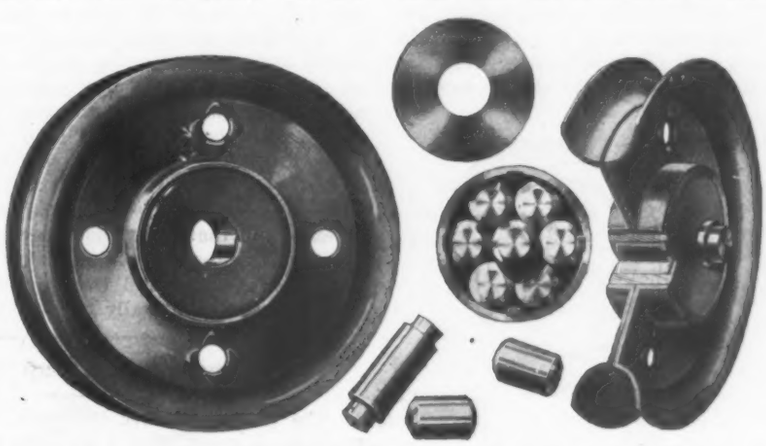


Fig. 2.—Grand Rapids Roller Bearing Wheel.

Runner Attachment.

Wheaton & Cockrell, Sunbury, Ohio, are offering the runner attachment for buggies and driving wagons, as shown herewith. The attachment is made of 1-inch steel tubing, is about 18 inches high, and is adjustable to different size spindles by an adjustable boxing, so as to fit any buggy or driving wagon. Fig. 2 shows how the box is made so as to let the pipe enter about 1 inch before the thread commences, to avoid any liability of the pipe breaking, as the weakest point is where the thread ceases. After the boxing is once adjusted to fit the spindles they can be put on in five minutes, it is remarked, as no clamps or braces are necessary. The change from wheels to runners necessitates only removing the wheels and slipping on the boxes, which have the

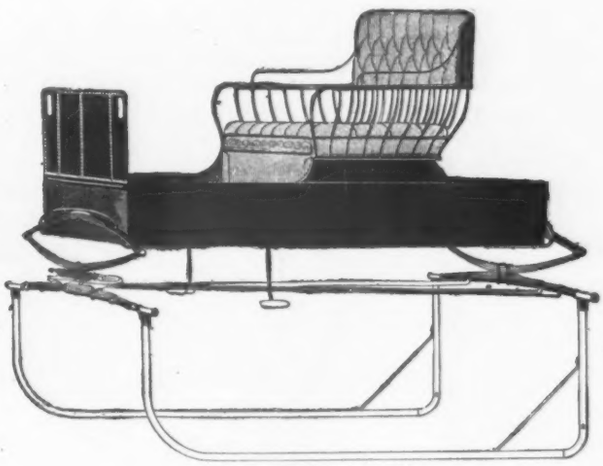


Fig. 1.—Runner Attachment.

runners attached, after which the nuts are screwed on the spindles. Among the advantages claimed for the device are the following: That there is no danger of pulling the vehicle in two, as both axles are fastened together by the runners; that there is no danger of upsetting in crossing street car tracks, as the runners, being round, do not catch; that the attachment is better than a sleigh because a buggy seat is more comfortable; that in passing over rough places the springs relieve the jolt; that the attachment is more easily stored than a sleigh, while there is no danger of moths, and that a top can be used on the buggy when the weather is cold or stormy.

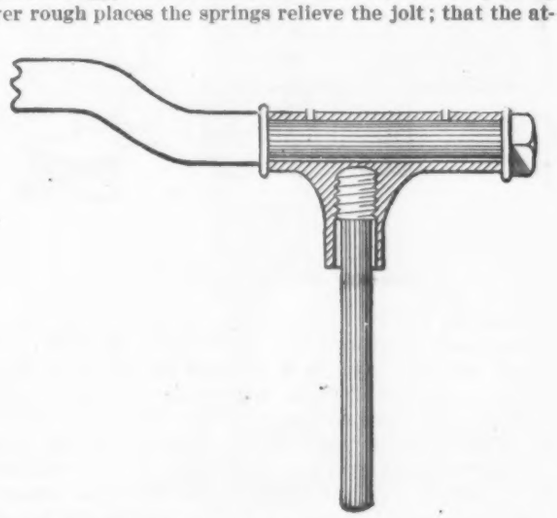


Fig. 2.—Showing How the Weakest Point of Attachment is Strengthened.

Improved Clamping Device for Micrometer Calipers.

Brown & Sharpe Mfg. Company, Providence, R. I., have recently placed on the market an improved clamping device for micrometer calipers, as shown in the accompanying cuts. The device is alluded to as simple in construction and unusually efficient, only a slight movement of the knurled ring being required to clamp the measuring spindle firmly. After the measurement has been taken it is often desirable to lock the spindle to obtain the measurement, and it is important that the spindle should not be rotated or moved longitudinally in order that the original measurement be not altered. The construction of this clamping device is such that the possibility of disturbing the adjustment is entirely avoided. Another feature to which attention is directed is that the tension of the measuring spindle can be adjusted without disturbing the threaded portion of the screw and nut. This is a valuable feature when measuring a number of pieces for comparison, as sufficient tension can be put on the spindle to prevent its turning when the work is passed between the measuring points, and at the same time the spindle can be left sufficiently free to allow of slight adjustments. When the clamping ring has been set to exert a certain tension the rotation of the spindle cannot alter it, as the clamping ring is held stationary and forms part of the bearing for the spindle. Referring to the cuts in Fig. 2, the operation of the mechanism is as follows: Split ring, No. 1, fits the measuring spindle with a sliding fit when open, thus insuring a comparatively longer bearing for the spindle. This ring is held from rotating by the lug 4, which fits into a recess in the slot 9, No. 3. The roller 3, No. 1, which moves upon the inclined surface cut in the periphery of the ring, is actuated by the ring 1, No. 2. The clamping ring, with the roller at the lowest point, fits into the ring 1 with a sliding fit, and as the clamping ring is held from rotating, the movement of the actuating ring 1, No. 2, to the right forces the roller up the inclined surface 5, No. 1, and closes the ring concentrically around the measuring spindle. The slot in the caliper frame, No. 3, receives the two rings, together with the roller, and the spindle is passed through the clamping ring. It is explained that, as the clamping ring closes concentrically and there is no opportunity for dirt or grit to get into the device, the spindle cannot be thrown out of alignment when clamping. Another important feature is that the clamping ring cannot be taken out of the frame until the spindle has been run out sufficiently to clear the recess. This prevents the device being accidentally detached or lost, as might be the case if a nut and split bushing fitted over the end of the spindle. It is explained that the various parts are accurately fitted together to prevent the possibility of any dirt or grit getting into them, and that as the movements are so slight there is practically no wear upon the parts.

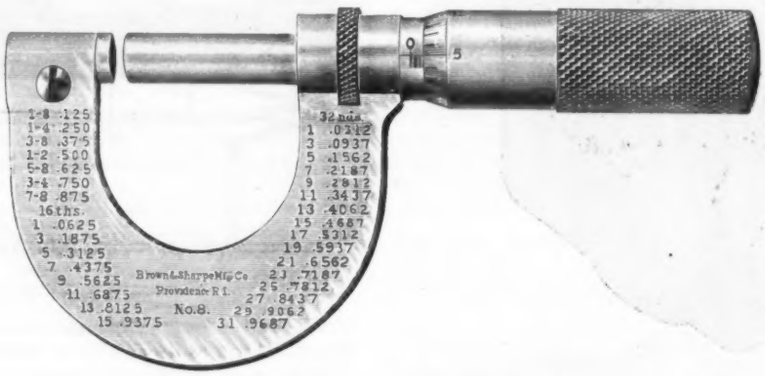


Fig. 1.—Micrometer Caliper with Clamping Device.

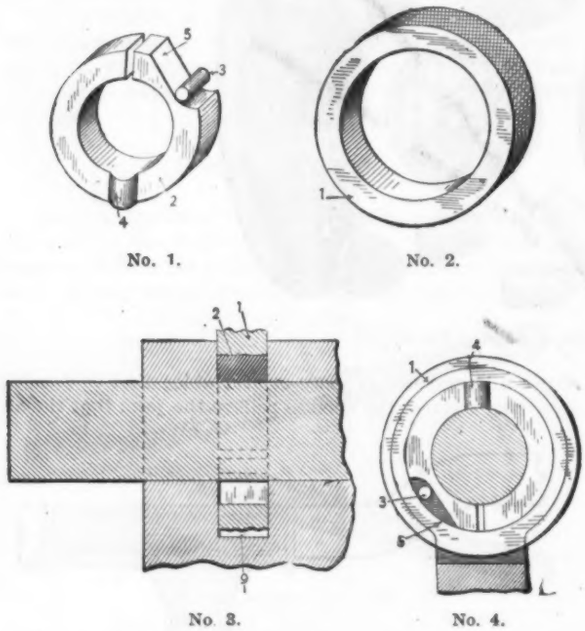


Fig. 2.—Parts of Clamping Device.

Sponge and Soap Holders.

The Charles Parker Company, Meriden, Conn., and 32 Warren street, New York, who are now manufacturing very complete lines of bathroom and lavatory furnishings and lavatory legs, tank, seat and lavatory brackets, shown in the illustrated catalogues recently issued, are making the combination sponge and soap holder No. 375, here represented. It is made of rolled sheet brass, polished and nickeled, and is 9 x 4 x 2¾ inches in size, this style being designed to overhang the side of a bathtub. The same pattern without the soap holder, known as No. 370, with bowl 6 x 4 x 2¾ inches in size, is also made, and lists but two-thirds of the price of the combination holder. There are ten other styles of sponge holders, single and in combination, shown, and 24 soap cups in connection with the line.

Combination Sponge and Soap Holder No. 375.

The Dudly Improved Nail Puller.

The A. Dudly Mfg. Company, Menominee, Mich., are placing upon the market the Dudly improved nail puller, shown herewith. The device is a radical departure

Fig. 1.—The Dudly Improved Nail Puller.

from the type commonly in use. The most prominent feature is that by its use nails are drawn out straight. Other advantages which are claimed for it are lightness of weight combined with efficiency, ease of operation, efficiency of the grip and the fact that the tool is self supporting, the operator merely guiding with the left hand, using the right hand to ram the handle and pull the lever. The geared cam lever engages with a rack bar, which is connected with the pivoted claw plate of the nail plunger. When the lever is raised above the plunger

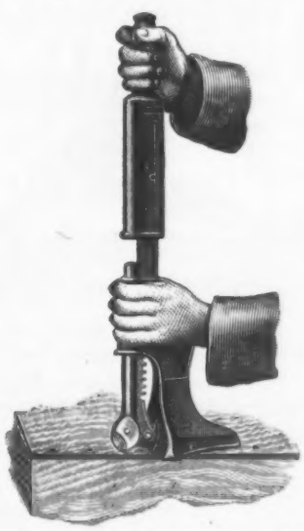
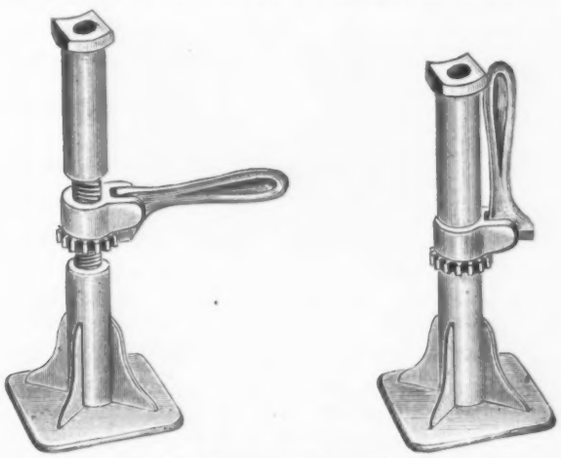


Fig. 2.—Dudly Nail Puller in Use.

it disengages from the rack bar, then the plunger is rammed down with the sliding rammer, like any other nail puller, until the points of the nail tongue reach below the nail head. By pulling the lever back the nail is gripped instantly and pulled out perfectly straight. The durability of the article is referred to as being insured by its construction, the manufacturers stating that the rack and cam gears are made of malleable iron and the claws of steel. The weight of the tool is 7½ pounds.

The Covert Auto Screw Jack.

Covert Mfg. Company, West Troy, N. Y., are putting on the market the screw jack shown herewith. It is made in two sizes, No. 501 being intended for use on motor vehicles. It weighs 7 pounds and will lift 3000 pounds and adjusts in hight from 11 to 17 inches. No. 503 is more powerful and is intended for heavy vehicles and trucks. It weighs 12 pounds and will lift 5000 pounds, adjusting in hight from 14¼ to 23¼ inches. This is a ratchet double screw lifting jack, the threads being right and left handed respectively on the upper and lower portions. The sleeve to which the lever is attached is free to move around the screw stem, while the toothed wheel below is securely fixed to the screw stem. The lever has a projection, or dog, from its inner end, which engages between the teeth of the wheel below. In operation the lever is lowered to throw the projection in engagement with the teeth of the wheel, and by shifting the lever in a horizontal direction the screw will be made to separate or draw together the upper and lower portions of the jack, to raise or lower the object as desired. De-



The Covert Auto Screw Jack.

tachable sections may be obtained which may be readily slipped on or taken off the upper portion of the jack, to give it the desired hight to accommodate various conditions. The point is made that there are no loose parts and that the jack takes up little space in a vehicle.

The Wilcox Steel Wagon Jack.

The jack shown in the accompanying illustration is the product of the Wilcox Mfg. Company, Aurora, Ill. The jack has been constructed so that the lifting of the

The Wilcox Steel Wagon Jack.

load is done perpendicularly with the aid of compound levers. The jack is made in three sizes, designated as Nos. 1, 2 and 3, the capacity of No. 1 being 900; No. 2, 1800, and No. 3, 4000 pounds.

The King Deep Well Strainer.

The deep well strainer shown herewith is wound of hardened wire on V-shaped longitudinal ribs of hard rolled metal. This has the advantage, it is pointed out, the fibers of metal running around the strainer with the circumference, not lengthways, of presenting the greatest possible resistance to pressure, either inward or outward. In the ribs, on the other hand, the fibers of metal

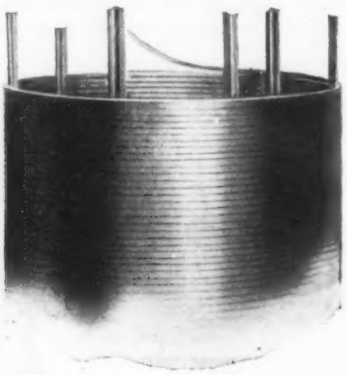


Fig. 1.—The King Deep Well Strainer.

run lengthways of the strainer, so as to give the greatest tensile strength against breakage. The wire, shown in Fig. 2, exact size, is of such cross section as to leave slots of the correct shape, with sloping surface only on the lower side, the upper side of each slot being a square shoulder. It is explained that the wear can be only half of what it would be if both edges sloped away, leaving two knife edges forming the slot. Because of its ribs the strainer is best adapted to wells where air lift is used,

Fig. 2.—Cross Section of Strainer Wall, Full Size.

the manufacturers state, as the ribs keep the air pipe from touching the inner surface of the strainer to prevent the force of the air coming all at one point on the strainer surface. Among other advantages resulting from the construction of the strainer are the following: That as there are only a few ribs, there are but few interruptions to the slotted circumference, whereby a comparatively larger straining capacity is gained; that because the slots are closer together there is a comparatively larger number of slots in a given length of strainer, and that

Fig. 3.—Top of Strainer.

the strainer is exceedingly strong in structure. Slots are made of any width desired, a favorite width being the one-hundredth part of an inch (10-1000 inch), though many like it a little coarser up to one and a half hundredths of an inch (15-1000 inch). Strainers are made with slots from the half of a hundredth up to ten one-hundredths of an inch wide, being one-tenth of an inch (5-1000 to 100-1000 inch), from 2 to 50 feet in length and from 3 to 10 inches in diameter. The strainers, being let down inside the well casings, have to be of slightly smaller diameter than the wells. The strainers are offered by the Kisinger-Ison Company, 466-470 Pioneer street, Cincinnati, Ohio.

Myers' Universal Sling Pulley.

The sling pulley shown in the accompanying cuts is for use with any make of hay carrier, without a change of fork pulley or the use of a registering head. In Fig. 1 the side or edge view of the sling pulley is shown, illus-

Fig. 1.—Myers' Universal Sling Pulley.

trating the reversible feature and the tripping device which extends from either side. As shown in Fig. 3, the regular fork pulley that is used with the carrier is passed down through the sling pulley and then attached to the

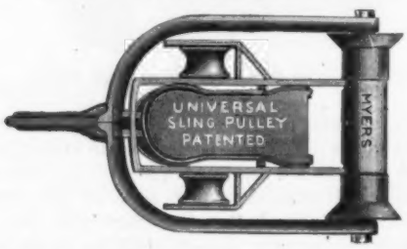


Fig. 2.—Top or Bottom View of Sling Pulley.

end of the sling, the sling pulley itself being attached to the opposite end of the sling. When the bundle is compressed, the fork pulley passes up against the sling pulley, tripping it, which dislodges the entire center section

Fig. 3.—Sling Pulley in Place Before Compressing the Bundle of Hay.

of the sling pulley and permits the fork pulley to pass through, thus compressing the bundle, as shown in Fig. 4. The dotted lines and arrow describe the movement of the center of the sling pulley after the fork pulley has come

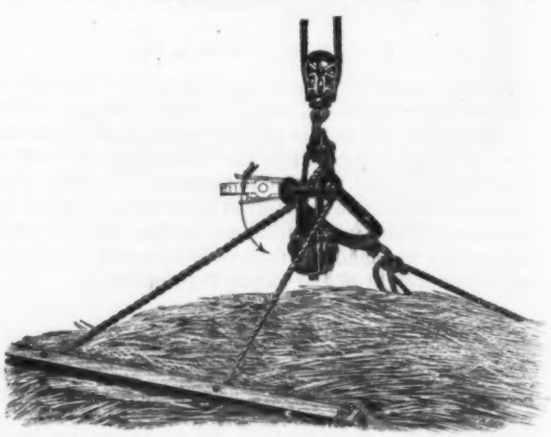


Fig. 4.—Position of Pulley When Bundle Has Been Compressed.

in contact with the trip. The device is put on the market by F. E. Myers & Bro., Ashland, Ohio, who state that it is a distinctly new invention, and that every claim asked for it in the application for patent was allowed.